Vol. 1085 Number 3

# OFFICIAL GAZETTE

of the

## UNITED STATES PATENT AND TRADEMARK OFFICE

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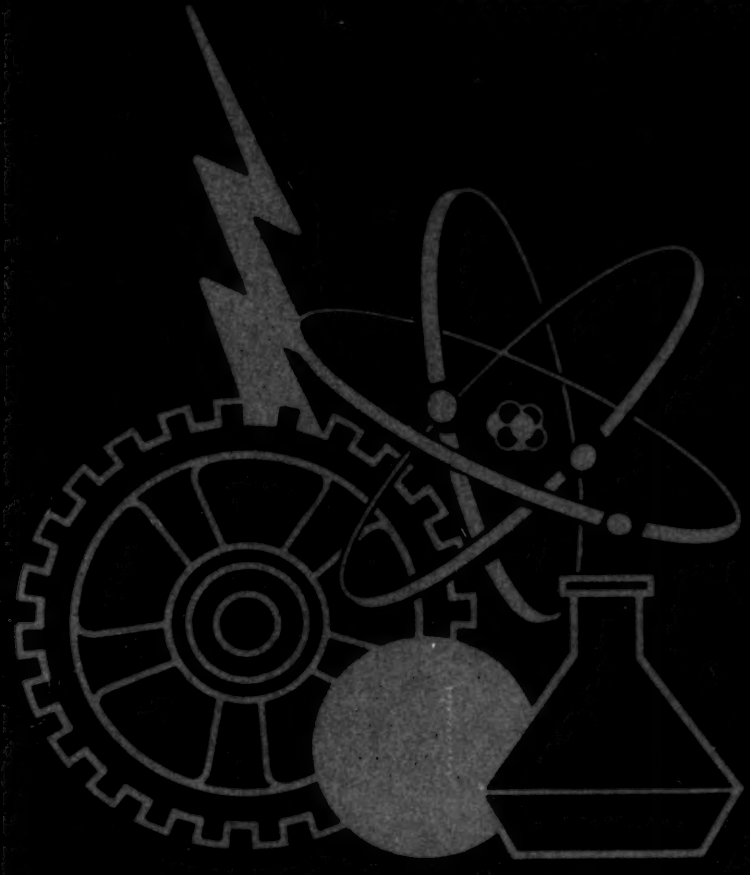
PATENTS

December 15, 1987



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Office

# OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

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Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

# PATENT AND TRADEMARK OFFICE NOTICES

### Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

Domestic PCT Fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Apr. 1, 1987 and was announced in the *Official Gazette* at 1077 O.G. 3 on Apr. 7, 1987.

International PCT fees were changed due to differences in the exchange rate and International PCT Chapter II fees effective July 1, 1987 were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

The national fees effective July 1, 1987 for entering the U.S. Patent and Trademark Office as a designated or elected Office as announced in the *Official Gazette* at 1079 O.G. 32, on June 16, 1987 are included for convenience of applicants.

The current schedule of PCT fees is as follows:

| | |
|---|---|
| Transmittal fee: | 170.00 |
| Search Fee | |
| U.S. Patent and Trademark Office as Searching Authority (ISA) | |
| —No corresponding prior U.S. national application filed: | 520.00 |
| —Corresponding prior U.S. national application filed: | 350.00 |
| —Supplemental search fee, per additional invention | 140.00 |
| European Patent Office as Searching Authority | 1180.00 |
| Preliminary examination fee | |
| U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA) | |
| —Search fee paid to USPTO as Searching Authority | 370.00 |
| —Additional examination fee, per additional invention | 125.00 |
| —Searching Authority not the USPTO | 570.00 |
| —Additional examination fee, per additional invention | 190.00 |
| International fees | |
| Basic fee: | 485.00 |
| Basic Supplemental fee (for each page over 30): | 10.00 |
| Designation fee for the first 10 national or regional offices: | 120.00 |
| Designation fee for 11th and subsequent designations: | No Charge |
| Handling fee | 150.00 |
| Supplement to the handling fee | 150.00 |

U.S. National Stage fees

| | Small Entity | Non-Small Entity |
|---|---|---|
| U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA) | 150.00 | 300.00 |
| USPTO was ISA but not IPEA | 170.00 | 340.00 |
| USPTO was neither ISA nor IPEA | 225.00 | 450.00 |
| USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(1) to (4) | 25.00 | 50.00 |
| —For each independent claim in excess of 3 | 17.00 | 34.00 |
| —For each claim in excess of 20 | 6.00 | 12.00 |
| —For each application containing a multiple dependent claim | 55.00 | 110.00 |
| —Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1 | 55.00 | 110.00 |
| —Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1 | 26.00 | 26.00 |

June 2, 1987.

DONALD J. QUIGG,
*Assistant Secretary and Commissioner of Patents and Trademarks.*

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### Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on December 11, 1984, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,486,901 through 4,488,312
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and

(h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98–622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

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**Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees**

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

*PATENTS WHICH EXPIRED SEPTEMBER 27, 1987, DUE TO FAILURE TO PAY MAINTENANCE FEES*

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,406,024 | 06/365,833 | 9/27/83 |
| 4,406,026 | 06/415,149 | 9/27/83 |
| 4,406,031 | 06/271,824 | 9/27/83 |
| 4,406,042 | 06/253,343 | 9/27/83 |
| 4,406,043 | 06/433,708 | 9/27/83 |
| 4,406,047 | 06/224,949 | 9/27/83 |
| 4,406,057 | 06/245,795 | 9/27/83 |
| 4,406,058 | 06/219,632 | 9/27/83 |
| 4,406,064 | 06/273,756 | 9/27/83 |
| 4,406,067 | 06/427,160 | 9/27/83 |
| 4,406,069 | 06/232,679 | 9/27/83 |
| 4,406,072 | 06/234,017 | 9/27/83 |
| 4,406,076 | 06/233,408 | 9/27/83 |
| 4,406,080 | 06/284,734 | 9/27/83 |
| 4,406,083 | 06/316,669 | 9/27/83 |
| 4,406,084 | 06/369,892 | 9/27/83 |
| 4,406,087 | 06/409,536 | 9/27/83 |
| 4,406,091 | 06/303,610 | 9/27/83 |
| 4,406,093 | 06/248,948 | 9/27/83 |
| 4,406,104 | 06/246,069 | 9/27/83 |
| 4,406,106 | 06/253,534 | 9/27/83 |
| 4,406,127 | 06/338,438 | 9/27/83 |
| 4,406,130 | 06/238,673 | 9/27/83 |
| 4,406,131 | 06/305,952 | 9/27/83 |
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| 4,406,198 | 06/266,100 | 9/27/83 |
| 4,406,200 | 06/283,750 | 9/27/83 |
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| 4,406,231 | 06/265,702 | 9/27/83 |
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| 4,406,368 | 06/328,425 | 9/27/83 |

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|---|---|---|
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| 4,406,696 | 06/254,125 | 9/27/83 |
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| 4,406,794 | 06/297,258 | 9/27/83 |
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| 4,406,799 | 06/372,598 | 9/27/83 |
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| 4,406,825 | 06/227,823 | 9/27/83 |
| 4,406,848 | 06/273,056 | 9/27/83 |
| 4,406,852 | 06/332,804 | 9/27/83 |
| 4,406,863 | 06/347,381 | 9/27/83 |
| 4,406,872 | 06/267,782 | 9/27/83 |
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| 4,406,900 | 06/304,357 | 9/27/83 |
| 4,406,904 | 06/283,084 | 9/27/83 |
| 4,406,909 | 06/265,050 | 9/27/83 |
| 4,406,928 | 06/250,461 | 9/27/83 |
| 4,406,941 | 06/361,746 | 9/27/83 |
| 4,406,947 | 06/255,122 | 9/27/83 |
| 4,406,951 | 06/290,716 | 9/27/83 |
| 4,406,973 | 06/466,911 | 9/27/83 |
| 4,406,982 | 06/320,514 | 9/27/83 |
| 4,406,995 | 06/262,896 | 9/27/83 |
| 4,406,998 | 06/246,009 | 9/27/83 |
| 4,407,001 | 06/308,009 | 9/27/83 |
| 4,407,009 | 06/315,373 | 9/27/83 |

## REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

**4,471,038,** Re. S.N. 042,923, Filed Apr. 27, 1987, Cl. 429/198, NICKEL-CADMIUM BATTERY, Brijesh Vyas, Owner of Record: *Bell Telephone Laboratories, Inc., Murray Hill, N.J.,* Attorney or Agent: J. P. McDonnell, et al., Ex. Gp.: 114

**4,520,082,** Re. S.N. 115,082, Filed Oct. 29, 1987, Cl. 514/560, USE OF UNDECYLENIC ACID TO TREAT HERPES LABIALIS, C. Richard Kinsolving, Owner of Record: *Pennwalt Corp., Phila., Pa.,* Attorney or Agent: Arthur H. Seidel, Ex. Gp.: 125

**4,520,728,** Re. S.N. 056,645, Filed June 1, 1987, Cl. 101/248, METHOD OF OPERATING A PRINTING PRESS AND METHOD, Harold Ecker, et al., Owner of Record: *Paper Converting Machine Co., Green Bay, Wis.,* Attorney or Agent: Timothy L. Tilton, et al., Ex. Gp.: 337

**4,524,410,** Re. S.N. 063,613, Filed Aug. 7, 1987, Cl. 362/255, INCANDESCENT LAMP WITH FILM OF ALTERNATELY STACKED LAYERS, Akira Kawakatsu, et al., Owner of Record: *Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki-Shi, Japan,* Attorney or Agent: Paul N. Kokulis, et al., Ex. Gp.: 342

**4,527,105,** Re. S.N. 069,141, Filed July 2, 1987, Cl. 318/444, AUTOMATIC WINDSHIELD WIPER SPEED CONTROL WITH PIEZOELECTRIC SENSOR, Yasuhiro Shiraishi, Owner of Record: *Nissan Motor Co., Ltd., Yokohama, Japan,* Attorney or Agent: Arthur Schwartz, et al., Ex. Gp.: 217

**4,538,872,** Re. S.N. 053,657, Filed May 26, 1987, Cl. 339/97P, ELECTRICAL CONTACT FOR TERMINATING INSULATED CONDUCTORS, Weldon L. Brubaker, et al., Owner of Record: *Molex, Inc., Lisle, Ill.,* Attorney or Agent: Louis A. Hecht, Ex. Gp.: 322

**4,545,342,** Re. S.N. 107,394, Filed Oct. 8, 1987, Cl. 123/198F, METHOD AND APPARATUS FOR THE CONTROL OF VALVE OPERATIONS IN INTERNAL COMBUSTION ENGINE, Yoshikatsu Nakano, et al., Owner of Record: *Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan,* Attorney or Agent: Robert Douglas Lyon, et al., Ex. Gp.: 342

**4,548,449,** Re. S.N. 110,375, Filed Oct. 20, 1987, Cl. 439/641, LAMP SOCKET ATTACHMENT, John A. Corsetti, Owner of Record: *Dennis L. Johnson, Jensen Beach, Fla.,* Attorney or Agent: John A. Clifford, et al., Ex. Gp.: 322

**4,577,956,** Re. S.N. 043,400, Filed Apr. 28, 1987, Cl. 355/40, PROCESS FOR THE CHAOTIC FILMING OF DOCUMENTS AND DEVICE FOR THE COMPLETION THEREOF, Rolf Klosterhuber, et al., Own-

er of Record: *Inventor,* Attorney or Agent: John H. Mion, et al., Ex. Gp.: 211

**4,583,978,** Re. S.N. 108,768, Filed Oct. 15, 1987, Cl. 604/208, SYRINGE, Michael Porat, et al., Owner of Record: *Inventor,* Attorney or Agent: Donald L. Dennison, Ex. Gp.: 336

**4,608,344,** Re. S.N. 107,763, Filed Oct. 9, 1987, Cl. 436/34, METHOD FOR THE DETERMINATION OF SPECIES IN SOLUTION WITH AN OPTICAL WAVE-GUIDE, Timothy J. N. Carter, et al., Owner of Record: *Battelle Memorial Institute, Carouge, Switzerland,* Attorney or Agent: Herbert Dubno, et al., Ex. Gp.: 134

**4,617,419,** Re. S.N. 108,436, Filed Oct. 14, 1987, Cl. 568/464, PROCESS FOR PREPARING NATURAL BENZALDEHYDE AND ACETALDEHYDE NATURAL BENZALDEHYDE AND ACETALDEHYDE COMPOSITIONS, PRODUCTS PRODUCED THEREBY AND ORGANOLEPTIC UTILITIES THEREFOR, Charles Wiener, et al., Owner of Record: *International Flavor and Fragrances, Inc., New York, N.Y.,* Attorney or Agent: Harold Haidt, Ex. Gp.: 126

**4,652,595,** Re. S.N. 115,074, Filed Oct. 30, 1987, Cl. 523/315, PROCESS AND APPARATUS FOR THE PREPARATION OF MIXTURES ISOCYANATE AND WATER WHICH ARE STABLE FOR A SHORT TIME FOR GLUEING PARTICULATE MATERIAL IN PARTICULAR CHIPS, FIBERS OR THE LIKES, Robert Peters, et al., Owner of Record: *Bayer Aktiengesellschaft, Leverkusen, Germany,* Attorney or Agent: Gene Harsh, et al., Ex. Gp.: 155

**4,663,471,** Re. S.N. 109,775, Filed Oct. 19, 1987, Cl. 556 /411, METHOD FOR THE PREPARATION OF N-METHYL-N-TRIMETHYLSILYL TRIFLUOROACETAMIDE, Toshio Shinohara, et al., Owner of Record: *Shin-Etsu Chemical Co., Ltd., Tokyo, Japan,* Attorney or Agent: Roy C. Hopgood, et al., Ex. Gp.: 124

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### REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**4,353,192,** Reexam. No. 90/001,370, Requested: Nov. 9, 1987, Cl. 52/281, FIRE-RESISTANT METAL STUD, Robert J. Pearson, Owner of Record: *National Gypsum Co., Buffalo, N.Y.,* Attorney or Agent: Allan H. Gernstein, Ex. Gp.: 350, Requester: Owner

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### COMMISSIONER ORDERED REEXAMINATIONS

Notice under 37 CFR 1.11(c). The orders for reexamination listed below are open to inspection by the general public in the indicated Examining Group. Copies of the Orders and other related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.21(b)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed. 37 CFR 1.248(a)(5) and 1.525(b).

**4,634,971,** Reexam. No. 90/001,371, Ordered: Nov. 16, 1987, Cl. 324/133, PORTABLE HAND-HELD VOLTAGE SENSOR WITH MANUALLY ADJUSTABLE REFERENCE VOLTAGE FOR COMPARISON WITH SENSED VOLTAGE, Robert C. Johnson, Owner of Record: *Ford Motor Co., Dearborn, Mich.,* Attorney or Agent: Paul K. Godwin, Ex. Gp.: 260, Requester: Commissioner of Patents, Washington, D.C.

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### Erratum

"All reference to Patent No. 4,656,490, to Koji Terasawa of Tokyo, Japan, for 'SUCTION RECOVERY APPARATUS OF INK-JET PRINTER', appearing in the Official Gazette of Apr. 7, 1987, should be deleted since no patent was granted."

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### Adverse Decisions in Interference

In the designated interferences involving the followng patents, final decisions have been rendered that the respective patentees were not the first inventors with respect to the claims listed.

Patent No. 4,031,395, Christopher Archibald Gordon Le May, RADIOGRAPHY, Interference No. 100,721, decided Apr. 28, 1987, claims 1, 2, 3, 5, 6 and 7.

Patent No. 4,225,696, Ralph W. Colpitts and Jens H. Wendt, PROSTHETIC DENTURE PREPARED FROM POLYURETHANE ELASTOMER, Interference No. 101,283, decided May 20, 1987 claims 1–7.

Patent No. 4,238,153, Toshinori Imura, AUTOMATIC FOCUS ADJUSTING DEVICE FOR CAMERAS, Interference No. 101,295, decided Aug. 22, 1987, claim 1.

Patent No. 4,278,635, Herman Kerst, METHOD FOR DEOXYGENATION OF WATER, Interference No. 101,126, decided Apr. 15, 1987, claims 1, 3, 4, and 5.

Patent No. 4,427,767, Kozo Aoki, Yoshio Seoka, COLOR PHOTOGRAPHIC SENSITIVE MATERIALS, Interference No. 101,337, decided Aug. 27, 1987, claims 1 and 3–6.

NANNIE B. HENRY,
*Deputy Clerk,*
*Board of Patent Appeals and Interferences.*

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### Adverse Decisions in Interference

In the designated interferences involving the following patents, final decisions have been rendered that the respective patentees are not entitled to patents containing the claims listed.

Patent No. 4,323,414, Larry A. Severson, SELF-SEALING CURING RIM FOR TUBELESS EARTHMOVER TIRE, Interference No. 101,671, decided Sept. 2, 1987, claims 1–14.

Patent No. 4,394,430, Thomas A. Jadwin, Robert C. Storey, ELECTROPHOTOGRAPHIC DRY TONER AND DEVELOPER COMPOSITIONS, Interference No. 101,792, decided Sept. 21, 1987, claims 1–7.

Patent No. 4,477,968, Alan G. Kracke, Tuan P. Tran, Beat G. Keel, METHOD FOR USING A MACHINING SENSOR, Interference No. 101,663, decided Oct. 26, 1987, claim 1.

Patent No. 4,501,924, Dennis K. Krass, HERBICIDALLY ACTIVE SUBSTITUTED DIPHENYL ETHER ACETALS OR KETALS, Interference No. 101,673, decided Oct. 5, 1987, claims 1–4.

Patent No. 4,519,796, Ronald D. Russo, THORACIC DRAINAGE DEVICE, Interference No. 101,600, decided Sept. 11, 1987, claims 1 and 3–6.

Patent No. 4,521,722, Richard C. Barthel and Richard D. Roy, APPLIANCE CONTROLLER, Interference No. 101,612, decided Aug. 27, 1987, claims 1–4.

NANNIE B. HENRY,
*Deputy Clerk,*
*Board of Patent Appeals and Interferences.*

# PATENT NOTICES

**Certificates of Correction for the Week of Dec. 15, 1987**

| | | | |
|---|---|---|---|
| D. 290,649 | 4,652,027 | 4,670,009 | 4,679,592 |
| D. 290,875 | 4,652,880 | 4,670,033 | 4,679,634 |
| 4,414,071 | 4,654,111 | 4,670,147 | 4,680,268 |
| 4,432,067 | 4,654,226 | 4,670,705 | 4,680,537 |
| 4,493,902 | 4,654,240 | 4,670,728 | 4,680,709 |
| 4,506,362 | 4,654,545 | 4,670,998 | 4,680,759 |
| 4,530,252 | 4,655,686 | 4,671,344 | 4,680,889 |
| 4,535,601 | 4,655,939 | 4,671,604 | 4,680,936 |
| 4,535,772 | 4,655,957 | 4,671,916 | 4,681,117 |
| 4,544,696 | 4,657,610 | 4,672,113 | 4,681,155 |
| 4,559,211 | 4,658,965 | 4,672,149 | 4,681,317 |
| 4,577,420 | 4,659,737 | 4,672,151 | 4,681,986 |
| 4,578,936 | 4,659,917 | 4,672,170 | 4,682,858 |
| 4,585,934 | 4,659,972 | 4,672,408 | 4,682,885 |
| 4,593,306 | 4,660,333 | 4,672,658 | 4,682,985 |
| 4,596,823 | 4,660,571 | 4,673,297 | 4,682,997 |
| 4,600,765 | 4,661,077 | 4,673,508 | 4,683,002 |
| 4,617,148 | 4,661,085 | 4,673,687 | 4,683,350 |
| 4,619,755 | 4,661,634 | 4,673,871 | 4,683,520 |
| 4,623,408 | 4,662,574 | 4,674,263 | 4,683,553 |
| 4,627,708 | 4,662,716 | 4,674,302 | 4,683,780 |
| 4,628,122 | 4,663,388 | 4,674,434 | 4,683,802 |
| 4,628,798 | 4,663,705 | 4,674,436 | 4,684,538 |
| 4,631,627 | 4,664,157 | 4,674,865 | 4,684,842 |
| 4,634,250 | 4,664,905 | 4,675,897 | 4,684,870 |
| 4,635,229 | 4,665,250 | 4,675,986 | 4,684,983 |
| 4,635,701 | 4,665,726 | 4,676,322 | 4,685,387 |
| 4,636,093 | 4,665,967 | 4,676,961 | 4,685,495 |
| 4,639,895 | 4,666,755 | 4,676,991 | 4,685,852 |
| 4,640,424 | 4,666,807 | 4,677,717 | 4,686,156 |
| 4,643,013 | 4,666,933 | 4,677,896 | 4,686,788 |
| 4,643,650 | 4,667,194 | 4,677,968 | 4,687,674 |
| 4,643,873 | 4,667,676 | 4,677,989 | 4,687,694 |
| 4,643,885 | 4,668,301 | 4,678,015 | 4,688,322 |
| 4,645,954 | 4,668,568 | 4,678,086 | 4,688,936 |
| 4,646,375 | 4,668,801 | 4,678,636 | 4,689,153 |
| 4,648,540 | 4,668,874 | 4,678,937 | 4,689,801 |
| 4,649,195 | 4,669,557 | 4,679,045 | 4,693,903 |
| 4,651,612 | 4,669,744 | 4,679,110 | |

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These patent collections are open to public use and each of the Patent Depository Libraries, in addition, offers the publications of the U.S. Patent Classification System (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the Patent Depository Libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

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# PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**

**JAMES E. DENNY, Deputy Assistant Commissioner**

**CONDITION OF PATENT APPLICATIONS AS OF October 24, 1987**

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director | 9-11-86 |
| ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director | 2-15-85 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director | 1-27-87 |
| HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director | 1-29-86 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director | 2-18-86 |
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| COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director | 5-02-86 |
| DESIGN, GROUP 290—K. L. CAGE, Director | 1-18-85 |
| **MECHANICAL EXAMINING GROUPS** | |
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| MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director | 10-15-85 |
| SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director | 2-06-87 |
| GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director | 1-02-87 |

**Expiration of patents**: The patents within the range of numbers indicated below expire during October 1987, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,531,806 to 3,537,106, inclusive

Plant Patents ..... Numbers 2,991 to 2,995 inclusive

# REEXAMINATIONS

## DECEMBER 15, 1987

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

**B1 3,989,899 (796th)**

**TELEPHONE SCHEDULING SYSTEM**

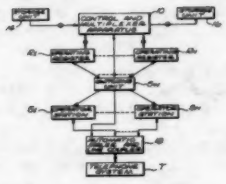
**Daniel Norwich, Beverly Hills, Calif., assignor to Telecredit Inc., Los Angeles, Calif.**

**Reexamination Request No. 90/001,163, Feb. 4, 1987.**

**Reexamination Certificate for Patent No. 3,989,899, issued Nov. 2, 1976, Ser. No. 566,643, Apr. 8, 1975.**

**Int. Cl.[4] H04M** *11/00, 1/26*

**U.S. Cl. 379—134**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–8** is confirmed.

**1.** A telephone scheduling system for use in cooperation with a telephone network, comprising:

storage means for storing a plurality of data cells including data on individual telephone numbers identifying stations to be contacted along with representations of message information:

at least one operating station including a telephone instrument, cue manifesting means, register means for receiving signals from said storage means representative of said data cells, and means for supplying data cell signals representative of message information from said register means to said cue manifesting means;

an automatic dialing means coupled to said telephone network and connected to receive data cell signals representative of telephone numbers from said operating station register means, for dialing said stations to be contacted;

sensing means coupled to said telephone network for providing an answer signal to indicate contact with one of said stations to be contacted and an interrupt signal to indicate termination of telephonic contact; and

sequence control means for sequentially providing signals representative of said data cells from said storage means to said operating station register means, returning said data cells to said storage means, and actuating said automatic dialing means, said telephonic instrument, and said cue manifesting means, under control of said sensing means.

**B1 4,445,944 (797th)**

**HEAT TREATMENTS OF LOW EXPANSION ALLOYS**

**Darrell F. Smith, Jr., and Edward F. Clatworthy, both of Huntington, W. Va., assignors to Huntington Alloys, Inc., Huntington, W. Va.**

**Reexamination Request No. 90/001,202, Mar. 23, 1987.**

**Reexamination Certificate for Patent No. 4,445,944, issued May 1, 1984, Ser. No. 302,975, Sep. 17, 1981.**

**Int. Cl.[4] C21D** *7/14;* **C22F** *1/10*

**U.S. Cl. 148—12.3**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1** and **5–18** is confirmed.

Claims **2** and **3** are determined to be patentable as amended.

Claim **4**, dependent on an amended claim, is determined to be patentable.

New claims **19–26** are added and determined to be patentable.

**1.** The method for providing elevated temperature notch strength in wrought products made of an alloy consisting essentially of about 34% to about 55% nickel, about 5% to about 25% cobalt, about 1.5% to about 5.5% columbium, about 1% to about 2% titanium, no more than 0.2% aluminum, up to about 0.1% carbon and the balance essentially iron, said columbium being replaceable by tantalum on the basis of two parts of tantalum for each part of columbium by weight, which comprises annealing said product at a temperature of about 1650° F. to about 1925° F. and then heating said annealed product in an intermediate temperature range of about 1375° F. to about 1550° F. for a time sufficient to overage said product, with the proviso that said intermediate temperature and time are upwardly graduated as the annealing temperature is increased, said temperature and time relationship being equivalent to at least 8 hours at the intermediate temperature of 1425° F. when the annealing temperature is 1900° F., and then heat treating said product in a lower temperature range of about 1100° F. to 1400° F. for at least 8 hours to provide in said product a notch strength of at least about 100 hours at 1000° F. and 100 ksi.

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**B1 4,486,944 (798th)**

**METHOD OF MAKING SINGLE POLY MEMORY CELL**

**Kim C. Hardee, Manitou Springs, Colo., assignor to Immos Corporation, Colorado Springs**

**Reexamination Request No. 90/001,107, Oct. 3, 1986.**

**Reexamination Certificate for Patent No. 4,486,944, issued Dec. 11, 1984, Ser. No. 485,732, Apr. 18, 1983.**

**Division of Ser. No. 164,285, Jun. 20, 1980.**

**Int. Cl.[4] H01L** *21/80*

**U.S. Cl. 437—52**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim **3** is cancelled.

Claims **1**, **2**, **4** and **5** are determined to be patentable as amended.

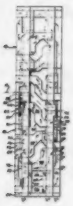
Claims **6–8**, dependent on an amended claim, are determined to be patentable.

New claims **9–13** are added and determined to be patentable.

**1**. A method for fabricating a *static RAM* bistable flip-flop memory cell having a pair of transfer transistors and a pair of driver transistors on a wafer of semiconductor material, including the steps of:

doping to form a buried ground line beneath the surface of a substrate portion of the wafer;

*establishing a layer of insulation over said wafer; and after said doping and establishing steps, then*



depositing only a single layer of polycrystalline silicon ("poly") on the wafer crossing over *said* conductive regions in the substrate; *thereafter*

*doping and etching said poly layer to delineate a power supply line over said ground line, a word line, and a pair of load resistors in said single poly layer; thereafter*

establishing insulation between the [polysilicon] *poly layer* and a metal layer to be established subsequently; and *thereafter*

establishing metal data lines for the memory cell *said data lines being formed over said ground line and said power supply line.*

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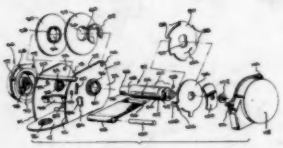
**B1 4,562,977 (799th)**

## EASILY ASSEMBLED SEAT BELT RETRACTOR AND METHOD

**William Hollowell, Pacific Palisades, Calif., assignor to American Safety Equipment Corp., Troy, Mich.**

**Reexamination Request No. 90/001,159, Jan. 27, 1987.**
**Reexamination Certificate for Patent No. 4,562,977, issued Jan. 7, 1986, Ser. No. 536,292, Sep. 27, 1983.**
**Int. Cl.[4] B60R** *22/34;* **B65H** *75/48*
**U.S. Cl. 242—107.4 D**



**AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:**

Claim **3** is cancelled.

Claim **1** is determined to be patentable as amended.

Claims **2** and **4–12**, dependent on an amended claim, are determined to be patentable.

New claim **13** is added and determined to be patentable.

**1**. A safety belt retractor comprising:

a retractor frame having [a] *an integrally formed* bottom and left and right side walls *and open top*; said side walls having inside faces facing each other and outside faces, said side walls each also having a belt storage spool shaft receiving opening for rotatable mounting of a belt storage spool shaft and wherein said left spool shaft receiving opening has a smaller diameter than said right spool shaft receiving opening;

a belt storage spool shaft having a left end, a middle portion, and right end, said belt storage spool shaft being sufficiently long so that said left and right spool shaft ends extend outward through their respective left and right side wall belt storage spool shaft receiving openings to position at least a portion of said belt storage spool shaft ends on the outside of said retractor frame when said belt storage spool shaft is rotatably mounted to said retractor frame, and wherein said spool shaft left end has a smaller diameter than said spool shaft right end, said belt storage spool shaft including a left shoulder portion between said left end and said middle portion to abut against said left wall inside face in said retractor frame when said spool shaft is mounted therein, said left shoulder portion having a diameter equal to or less than the diameter of said spool shaft right end, and said spool shaft middle portion having a diameter equal to or less than the diameter of said spool shaft right end;

means for rotatably mounting said belt storage spool shaft within said belt storage spool shaft receiving openings in said retractor frame side walls, said means for rotatably mounting said spool shaft including retainer spring means mountable on said belt storage spool shaft adjacent said right wall inside face when said storage spool shaft is mounted to said retractor frame for maintaining the position of said storage spool shaft left shoulder adjacent said left wall inside face during rotation of said belt storage spool shaft;

a left belt rub protector disc having a centrally located storage spool shaft receiving opening;

*a circular collar integral with said disc surrounding the belt storage spool shaft receiving opening in said disc, said collar being press fit onto said belt storage spool shaft to provide* [means] for mounting *of* said left belt rub protector disc on said belt storage spool shaft adjacent said left side wall inside face;

a right belt rub protector disc having a centrally located belt storage spool shaft receiving opening;

*a circular collar integral with said disc surrounding the belt storage spool shaft receiving opening in said disc, said collar being press fit onto said belt storage spool shaft to provide* [means for] mounting *of* said right belt rub protector disc on said belt storage spool shaft adjacent said [left] right *side* wall;

a safety belt;

means for mounting said safety belt to said belt storage spool shaft, said safety belt being extendable between a retracted position where said belt is wound around said belt storage spool shaft and an extended position where said belt is unwound from said belt storage spool shaft;

means associated with said belt storage spool shaft left end and mounted to said left side wall outside face for biasing said belt storage spool shaft in a belt retraction direction; and

ratchet means for preventing extension of said belt upon actuation at selected positions between said belt retracted and extended positions;

actuation means for actuating said ratchet means at said selected belt extension positions.

*13. A saftey belt retractor according to claim 1 which further includes brace bar means extending between the left and right side walls for providing support therebetween.*

# REISSUES

## DECEMBER 15, 1987

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

**Re. 32,558**

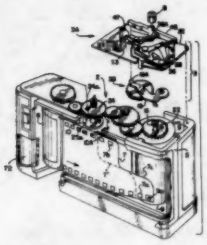
### AUTOREWINDING SELF-THREADING CAMERA

**Kwok Y. Chan, North Point, Hong Kong, assignor to Eastman Kodak Company, Rochester, N.Y.**

**Original No. 4,416,525, dated Nov. 22, 1983, Ser. No. 282,722, Jul. 13, 1981. Application for reissue Nov. 22, 1985, Ser. No. 801,133**

**Int. Cl.⁴ G03B** *1/18;17/42*

**U.S. Cl. 354—173.1** **53 Claims**



*32. In an electrically powered still camera for receiving a cassette film dispenser for a filmstrip having edge perforations, said camera including a film compartment for said cassette; a filmstrip take-up spool in said compartment; filmstrip capturing means on said take-up spool for capturing a film perforation with said filmstrip laid against said take-up spool and to wind the same forwardly when said take-up spool is driven in an advancing forward direction; manually operable shutter release means; film metering sprocket means for engaging a film perforation intermediate said dispenser and said take-up spool, and electric motor means energized in response to operation of said manually operable shutter release means for driving said take-up spool in a forward film winding direction to advance a captured filmstrip one frame, the improvement comprising: coupling means coupling said motor means to said film metering sprocket means so that the motor means drives the sprocket means forwardly at a lower speed than said take-up spool is driven forwardly unless decoupled from the motor means when the film metering sprocket is driven by the film movement, said coupling means including one-way clutch means operable between a freely decoupled condition and an engaged non-slipping condition for automatically decoupling said movable film metering sprocket from said motor means during rewind and when said take-up spool drives the filmstrip at a higher speed than said motor means drives said sprocket means during film advance; film metering switch means responsive to the movement of said film metering sprocket for de-energizing said motor means after a one-frame advance of said filmstrip; and shutter cocking means coupled to said film metering sprocket for re-cocking the shutter of said camera attendant to a one-frame advance of said film-engaging means when the sprocket means is driven in a forward direction.*

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**Re. 32,559**

### CARD EDGE CONNECTOR LOCKING DEVICE

**James L. Fedder, Harrisburg, and Attalee S. Taylor, Palmyra, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

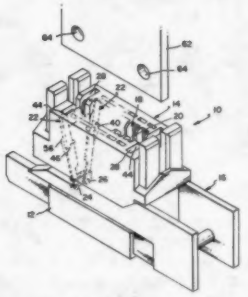
**Original No. 4,487,468, dated Dec. 11, 1984, Ser. No. 453,653, Dec. 27, 1982. Application for reissue Nov. 20, 1986, Ser. No. 933,009**

**Int. Cl.⁴ H01R** *13/639*

**U.S. Cl. 439—325** **6 Claims**

*6. A locking device for use with card edge connectors of the type having a lower housing, a vertically moving upper housing, a card receiving slot and cavities normal to and opening into the slot, said locking device comprising:*

*a. a pair of identical, elongated arms pivotally disposed in the lower housing with the pivotal motion being normal to the card receiving slot, said arms extending upwardly into the upper housing and having on their upper ends a nose which faces towards the slot; and*



*b. a first follower on one side of each arm and cooperative cam means on the cavity wall adjacent thereto to pivot the arms in towards the slot as the upper housing moves upwardly whereupon the noses enter holes in a card which may be in the slot to lock the card therein, and a second follower on the other side of each arm and cooperative cam means on the cavity wall adjacent thereto to pivot the arms out from the slot as the upper housing moves downwardly whereupon the noses are withdrawn from the holes to unlock the card.*

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**Re. 32,560**

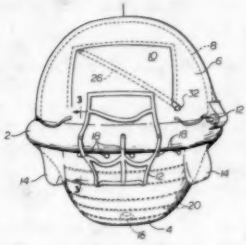
### STABILIZED SURVIVAL RAFT

**James A. Givens, 19 Willow St., Newport, R.I. 02840**

**Original No. 4,001,905, dated Jan. 11, 1977, Ser. No. 573,914, May 2, 1975. Continuation of Ser. No. 863,873, Dec. 23, 1977, abandoned, and a continuation-in-part of Ser. No. 314,389, Dec. 12, 1972, Pat. No. 3,853,913, which is a continuation-in-part of Ser. No. 216,990, Jan. 11, 1972, abandoned. Application for reissue Jul. 17, 1981, Ser. No. 284,200**

**Int. Cl.⁴ B63C** *9/04*

**U.S. Cl. 441—37** **12 Claims**



**1.** A greatly improved device for assisting in the saving of lives at sea including a platform capable of supporting humans, said platform maintained in a stable upright floating condition by a buoyant peripheral flotation structure and [an attached main stabilizing chamber extending around the periphery of

the flotation structure,] *a substantially closed, pendulous main stablizing chamber secured to the flotation structure* said chamber designed to be filled with the supporting fluid when the device is in use, the improvement comprising:

a. [a circumferential] sheet means secured to the buoyant peripheral flotation structure at a point spaced from the attachment of the *main* stabilizing chamber and extending downwardly therefrom, said sheet *means* being secured to the main stabilizing chamber distally from the flotation structure thus forming a peripheral chamber, and

b. openings in the wall of the [circumferential] sheet means whereby the peripheral chamber quickly fills with the supporting fluid and serves as a stabilizer until the main chamber fills with fluid.

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**Re. 32,561**

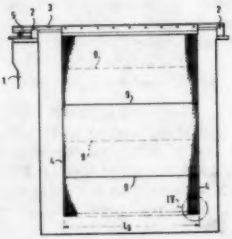
## COATED METAL ANODE FOR THE ELECTROLYTIC RECOVERY OF METALS

**Konrad Koziol, Rothenbach a.d. Pegnitz, and Erich Wenk, Nuremberg, both of Fed. Rep. of Germany, assignors to Conradty GmbH & Co. Metallelektroden KG, Fed. Rep. of Germany**

**Original No. 4,391,695, dated Jul. 5, 1983, Ser. No. 231,165, Feb. 3, 1981. Application for reissue Jun. 11, 1984, Ser. No. 619,778**

**Int. Cl.[4] C25B *11/02***

**U.S. Cl. 204—288** **15 Claims**



1. A coated metal anode for the electrolytic recovery of metals, the working surface of which is represented by rods which are arranged in a plane in spaced, parallel relationship to each other, and which are electrically connected to a current supply rail, wherein:

said rods lie in a plane with the current supply rail, so as to create a substantially planar rectangular, surface of the anode;

said rods being arranged in such a manner that a larger portion of the area of said rods extends perpendicular to the arrangement plane assumed by said rods than is congruent with said plane; and

said rods are connected to said current supply rail at one end face; and

both the electrical and mechanical connection of each rod with said current supply rail takes place by means of at least one connecting strip extending parallel to said rod; and wherein

one marginal region of said connecting strip is connected with said current supply rail and another marginal region is connected with said rods.

**Re. 32,562**

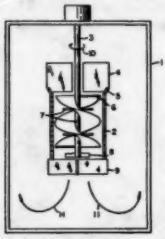
## PROCESS AND APPARATUS FOR MIXING A GAS AND A LIQUID

**Lawrence M. Litz, Pleasantville, N.Y., assignor to Union Carbide Corporation, Danbury, Conn.**

**Original No. 4,454,077, dated Jun. 12, 1984, Ser. No. 396,281, Jul. 8, 1982. Application for reissue Jun. 10, 1986, Ser. No. 873,197**

**Int. Cl.[4] B01F *3/04***

**U.S. Cl. 261—91** **4 Claims**



1. In a process for mixing a gas and a liquid in an apparatus comprising, in combination:

(a) a vessel;

(b) a cylindrical hollow draft member open at both ends and having a theoretical axis running from end to end, said axis being in a vertical position; [and the upper end of the draft member being conically flared;]

(c) an axial flow down-pumping first impeller fixedly connected to a rotatable shaft, (i) the first impeller being positioned within the draft tube; (ii) the shaft corresponding in position to the axis; and (iii) the diameter of the first impeller being less than, but proximate to, the diameter of the draft tube;

(d) first vertical baffling means disposed above the impeller;

(e) means for rotating the shaft; and

(f) means for introducing the gas and the liquid into the vessel and for removing gas and liquid from the vessel, the process comprising:

(A) energizing the shaft to provide the first impeller with a rotational speed sufficient to cause (i) vortex formation downward from the surface of the liquid in the vicinity of the first vertical baffling means and [the flare] of the *upper end of said* draft member such that the gas is drawn into and down the draft tube and (ii) turbulence in the draft tube;

(B) introducing a sufficient amount of liquid into the vessel to provide, during operation, a liquid level above the upper end of the draft tube; and

(C) recovering liquid from the vessel, the improvement comprising

(1) providing a rotational speed to the first impeller sufficient to impart a liquid velocity down the interior of the draft tube of at least one foot per second;

(2) increasing the turbulence of the liquid at the shaft proximate to the first impeller;

(3) in the area in the draft tube below the first impeller or in the area below, and immediately exterior to, the lower end of the draft tube, providing second vertical baffling means; and

(4) in the area in the draft tube between the first impeller and the second vertical baffling means providing a radial flow impeller fixedly connected to the shaft whereby a high shear zone is created in the area heretofore mentioned in this paragraph (4).

2. In an apparatus for mixing a gas and a liquid comprising, in combination:

(a) a vessel,

(b) a cylindrical hollow draft member open at both ends and

having a theoretical axis running from end to end, said axis being in a vertical position; [and the upper end of the draft member being conically flared.]

(c) an axial flow down-pumping first impeller fixedly connected to a rotatable shaft, (i) the first impeller being positioned within the draft tube; (ii) the shaft corresponding in position to the axis; and (iii) the diameter of the first impeller being less than, but proximate to, the diameter of the draft tube;

(d) first vertical baffling means disposed above the impeller;

(e) means for rotating the shaft; and

(f) means for introducing the gas and the liquid into the vessel and for removing liquid from the vessel, the improvement comprising:

(1) protuberances or indentations located on the shaft or first impeller of sufficient size, and positioned, to increase the turbulence at the shaft proximate to the first impeller;

(2) second vertical baffling means located in the area in the draft tube below the first impeller or in the area below, and immediately exterior to, the lower end of the draft tube; and

(3) a radial flow impeller fixedly connected to the shaft located in the area in the draft tube between the first impeller and the second vertical baffling means whereby a high shear zone is created in said area.

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**Re. 32,563**

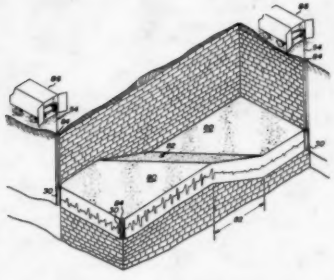
## CONTINUOUS WAVE MEDIUM FREQUENCY SIGNAL TRANSMISSION SURVEY PROCEDURE FOR IMAGING STRUCTURE IN COAL SEAMS

**Larry G. Stolarczyk, Raton, N. Mex., assignor to Stolar, Inc., Raton, N. Mex.**

**Original No. 4,577,153, dated Mar. 18, 1986, Ser. No. 731,741, May 6, 1985. Continuation-in-part of Ser. No. 483,264, Apr. 8, 1983, abandoned. Application for reissue Jul. 28, 1986, Ser. No. 889,896**

**Int. Cl.[4] G01V** *3/12, 3/30*

**U.S. Cl. 324—334** **20 Claims**



1. A method for detecting geological anomalies in underground coal seam formations comprising

placing an FM transmitter having continuous wave transmit capabilities in a medium frequency range of between approximately 300 KHz to approximately 800 KHz about a coal seam to be analyzed, the transmitter including a tuned-loop antenna for propagation through said seam;

placing a medium frequency FM receiver having continuous wave receive capability and including a tuned-loop antenna about said seam remote from the position of the transmitter with said seam intermediate to the transmitter and receiver, said tuned-loop antennas of the receiver and transmitter being positioned to be vertical to said seam, said receiver further including measuring and recording means for measuring and recording a plurality of characteristics of said received waves propagated through said seam;

exposing said seam to a plurality of transmissions of continuous wave medium frequency waves with an azimuthal magnetic field component propagated horizontally through said seam from the transmitter towards the receiver;

measuring a plurality of signal transmission characteristics through said seam;

generating a number of data points by locating both the transmitter and receiver at several points about said seam such that for each transmitter location the receiver is placed at a plurality of preselected points about said seam;

calculating a plurality of expected signal transmission characteristics through said seam; and

comparing said calculated signal transmission characteristics with said measured signal transmission characteristics and generating a graphical representation of said formation thereform.

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**Re. 32,564**

## APPARATUS FOR DETERMINING THE RESISTIVITY OF A SUBSURFACE EARTH FORMATION AT DIFFERENT LATERAL DISTANCES FROM A BORE HOLE WALL

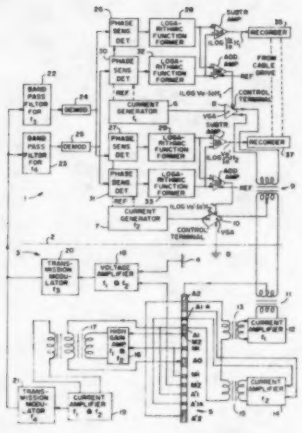
**Andre Scholberg, Corseaux, Switzerland, assignor to Schlumberger Technology Corporation, New York, N.Y.**

**Original No. 3,772,589, dated Nov. 13, 1973, Ser. No. 233,668, Mar. 10, 1972. Application for reissue Aug. 13, 1980, Ser. No. 177,560**

**Claims priority, application France, Mar. 11, 1971, 71.08426**

**Int. Cl.[4] G01V** *3/24*

**U.S. Cl. 324—373** **22 Claims**



1. An apparatus for the electrical investigation of earth formations traversed by a borehole, comprising:

a. an electrode system comprising a central electrode *for emitting current having frequencies $f_1$ and $f_2$ into said formation* and four pairs of electrodes respectively shortcircuited and aligned symmetrically about said central electrode at increasing distances therefrom, the central electrode and the electrodes of the third and fourth pairs being called current electrodes, the electrodes of the first and second pairs being called voltage electrodes;

b. means for producing an alternating current at a first frequency, $f_1$, coupled between the [electrodes of the fourth pair and at least one of the other current electrodes] *third electrode pair and the fourth electrode pair to focus $f_1$ current emitting from said central electrode*;

c. means for producing an alternating current at a second frequency, $f_2$, coupled between [one of the current electrodes and] an electrode at electrical infinity with respect to the electrode system, *and one of the third and fourth electrode pairs, said one of the third and fourth electrode*

*pairs being further coupled through a low impedance at frequency $f_2$ with the other of said third and fourth electrode pairs to focus $f_2$ current emitting from said central electrode;*

d. means for maintaining the potential difference between the first and second pairs of electrodes at substantially zero, said means adapted to monitor the potential difference between the first and second pairs of electrodes and to emit current from the central current emitting electrode in response to the measured potential difference to reduce the potential difference to zero; and

e. means for measuring the electrical potential proximate to one of the first and second pairs of electrodes and the current emitted from the central electrode to produce therefrom signals representative of the electrical resistivity of the formation [located] at different lateral distances from the borehole.

# PLANT PATENTS

## GRANTED DECEMBER 15, 1987

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

**6,060**

### CHRYSANTHEMUM NAMED 'RED REFLA'

**Martinus van der Jagt, Ter Aar, Netherlands, assignor to Chrysanthemum Breeders Association, N.V., Netherlands Antilles**

**Filed Sep. 30, 1985, Ser. No. 781,991**

**Int. Cl.[4] A01H** *5/00*

**U.S. Cl. Plt.—74** **1 Claim**

1. A new and distinctive variety of Chrysanthemum as described and illustrated in the foregoing specification and accompanying drawings.

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**6,061**

### CARNATION PLANT NAMED ACE HIGH

**William E. Duffett, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio**

**Filed Oct. 30, 1985, Ser. No. 792,989**

**Int. Cl.[4] A01H** *5/00*

**U.S. Cl. Plt.—70** **1 Claim**

1. A new and distinct cultivar of *Dianthus caryophyllus*, Linn., named Ace High as described and illustrated, and particularly characterized as to distinctiveness by the combined characteristics of commercial double flower type, flat, slightly reflexed form, miniature size of 45 to 65 mm. diameter, light orange with scarlet red variegated color, medium response, 6 to 8 flowers and buds showing color per stem, medium 10 to 12 cm. peduncle length, strong peduncle strength, and tall plant height.

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**6,062**

### CHRYSANTHEMUM NAMED 'RENEW'

**Martinus van der Jagt, Ter Aar, Netherlands, assignor to Chrysanthemum Breeders Association NV, Netherlands Antilles**

**Filed Sep. 30, 1985, Ser. No. 781,884**

**Int. Cl.[4] A01H** *5/00*

**U.S. Cl. Plt.—74** **1 Claim**

1. A new and distinctive variety of Chrysanthemum as described and illustrated in the foregoing specification and accompanying drawings.

# PATENTS

## GRANTED DEC. 15, 1987

### ERRATA

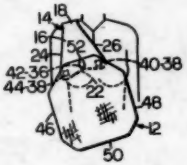
| For CLASS | See PATENT NO. |
|---|---|
| 437-027 | 4,712,291 |
| 040-417 | 4,712,403 |
| 209-455 | 4,712,682 |
| 206-631 | 4,712,727 |
| 439-033 | 4,712,846 |
| 439-155 | 4,712,847 |
| 439-327 | 4,712,848 |
| 439-607 | 4,712,849 |
| 439-861 | 4,712,850 |
| 428-472 | 4,712,121 |
| 437-029 | 4,712,329 |
| 585-424 | 4,713,424 |

# PATENTS

## GRANTED DECEMBER 15, 1987

## GENERAL AND MECHANICAL

**4,712,251**
**NURSING BLANKET**
**Danna J. Cobble, P.O. Box 7294, Oklahoma City, Okla. 73153**
**Filed Nov. 10, 1986, Ser. No. 928,919**
**Int. Cl.[4] A41D** *13/10, 1/20*
**U.S. Cl. 2—49 R** **1 Claim**




1. A nursing garment for concealing the mother's breast and child's head and upper torso, comprising:

an elongated fabric bib means characterized by longitudinally extending front and back end portions of substantially equal mass respectively overlying the right or left upper chest and back area of the user and being integrally interconnected in longitudinally aligned relation by a shoulder overlying portion having a transverse width substantially less than the transverse width of the front and back portions for normally maintaining the bib means balanced on a user's shoulder,

said front portion having a depending end surface substantially defining an arcuate concave curve between its lateral limits at least partially complemental with the curve of the upper limit of a user's breast;

fabric sheet blanket means depending from said bib means and characterized by opposing marginal side edges converging upwardly toward an upwardly disposed end edge of substantially equal dimension with respect to and overlying the lowermost end portion of the bib front portion; and,

a plurality of spaced-apart pairs of fasteners separably joining, in overlying relation, the respective ends and medial portion of the upper end edge portion of said blanket means to the depending end portion of said bib front portion for normally concealing the user's breast and a nursing child,

whereby the medial portion of the blanket upper end edge may be separated from the bib front portion for air circulation and user viewing the nursing child.

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**4,712,252**
**ANTI-WIND RAINCOATS**
**Hsii C. Chou, 181, Guang Hwa 1 Rd., Kaohsiung, Taiwan (800); Jeef Wu, 2F, No. 9-1, Lane 80, Guang Fu 1 St., and John Chang, 19, Alley 24, Lane 29, Chung Hwa 1 Rd., both of Kaohsiung, Taiwan**
**Filed Apr. 22, 1987, Ser. No. 41,116**
**Int. Cl.[4] A47B** *3/04*
**U.S. Cl. 2—87** **1 Claim**

1. A kind of anti-wind raincoat comprising,

a coat made of cloth that can prevent wind or rain from blowing through or wetting, and having two sleeves at the shoulders, and a horizontal zipper at the lowest part for hiding a skirt able to be rolled up inside or rolled down when the zipper has been pulled open,

sleeves having separately a ring of sticker fastening around its upper part and around inside near elbows which can stick together when the sleeves are folded up short,

a skirt made up as a kind of pleated skirt extending down from the lowest part of the coat, having a vertical opening at its front; one side and the other side of the opening are verticaally set with a sticker fastening separately inside and outside which can be stick together, and having the characteristics that in fine weather the skirt can be rolled up and hidden in the lowest part of the coat by means of the horizontal zipper set around the coat, and the sleeves

can be folded up short kept steady by sticking together the sticker fastenings, and that in wet weather the skirt can be rolled down by pulling open the zipper and stuck together by the sticker fastenings and the sleeves can also be folded down long by releasing the sticker fastenings.

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**4,712,253**
**HUNTING GLOVE WITH TELESCOPIC FOREFINGER SHEATH**
**Yi-Yi Chen, P.O. Box 10160, Taipei, Taiwan**
**Filed Dec. 22, 1986, Ser. No. 945,008**
**Int. Cl.[4] A41D** *19/00*
**U.S. Cl. 2—159** **3 Claims**

1. A hunting glove with telescopic forefinger sheath comprising:

an elastic thick covering formed on a palm piece of a mitten and having cut with an U-shaped opening within said covering to form an U-shaped lid as positioned approximately between a finger cushion and a phalanx of a wearer's forefinger when wearing such a mitten, said thick covering having sound elasticity such that said lid is adapted to be automatically recovered to close said U-shaped opening; and

a soft forefinger sheath having a thickness thinner than that of said covering and having a sound toughness and hand feeling and having a lower edge of the forefinger sheath fixed on an oval-shaped opening of a lining jacketed inside the palm piece and a back piece of the mitten, said oval-shaped opening said forefinger sheath being corresponding with said U-shaped opening of said elastic thick covering, and said forefinger sheath adapted to telescopically protrude through said U-shaped opening and said lid of

said covering and to retract therethrough to be concealed inside the mitten.

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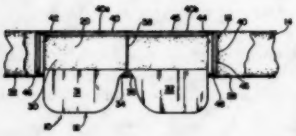
4,712,254

## HEADBAND AND EYEPIECE COMBINATION

Ronald H. Daigle, 20 Nickerson St., Cranston, R.I. 02910

Filed Aug. 29, 1986, Ser. No. 902,180
Int. Cl.[4] A61F 9/02
U.S. Cl. 2—452 8 Claims



1. A headband and eyeglasses combination consisting essentially of a headband element having an open pocket therein which opens outwardly along an edge thereof, said headband element being receivable in encircling relation on the head of a wearer so that it extends across the forehead of said wearer in snug engagement therewith and so that said pocket opens downwardly adjacent said forehead, a flexible eyepiece receivable in said pocket, and means securing said eyepiece to said headband element so that it is alternatively positionable in a retracted first position wherein it is received in the pocket and a second position wherein it extends downwardly from the headband element and is disposed in front of the eyes of said wearer.

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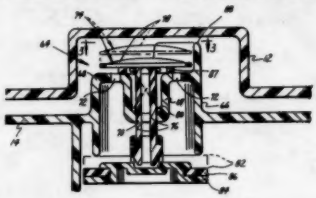
4,712,255

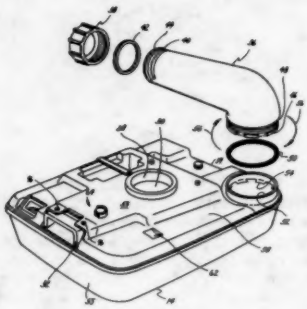
## PORTABLE TOILET WITH VALVE ACTUATING HANDLE THAT AUTOMATICALLY LOCKS THE VALVE IN CLOSED POSITION DURING EMPTYING OF THE HOLDING TANK

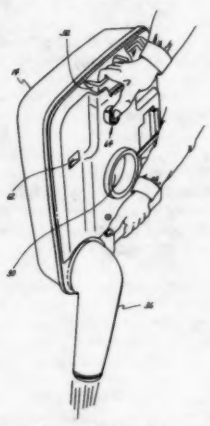
John M. Antos, Ann Arbor, and John R. Selina, Ypsilanti, both of Mich., assignors to Thetford Corporation, Ann Arbor, Mich.

Filed Aug. 20, 1986, Ser. No. 898,466
Int. Cl.[4] E03D 1/00; A47K 11/02, 11/03
U.S. Cl. 4—323 5 Claims

1. In a portable toilet having a holding tank section and a seat section separably mounted on the holding tank section, said seat section including a bowl and said holding tank section including a valve which is operable to allow contents of the bowl to be deposited into the holding tank, a discharge spout via which the contents of the holding tank may be emptied after the seat section has been removed from the holding tank, a handle for operating said valve, means releasably locking said handle in a position maintaining said valve in its closed position in response to removal of said seat section from said holding







tank section to insure that said valve is closed during emptying and carrying of said holding tank.

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4,712,256

## COVER PLATE AND MOUNTING CLIP ASSEMBLY

Henry M. Stairs, Jr., Neshanic, N.J., assignor to American Standard Inc., New York, N.Y.

Filed Mar. 3, 1986, Ser. No. 835,820
Int. Cl.[4] E03D 11/00
U.S. Cl. 4—661 5 Claims

1. An assembly to conceal an opening which houses a mounting bolt of a sanitary fixture, said assembly comprising:

a cover plate and metal retainer clip;

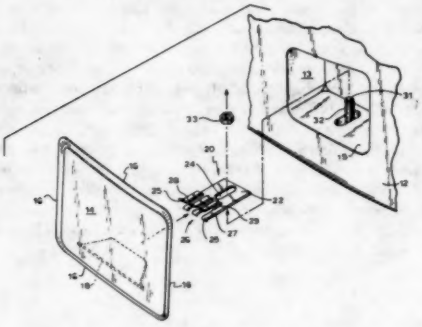
said clip having a generally rectangular, flat body segment, one section of which is formed having an elongated longitudinal slot for receiving a shank of a threaded anchor bolt and another section formed having at least three parallel, horizontally extending gripping fingers, two of which are coplanar and are in spaced apart relation, said other finger being offset therefrom and positioned between said two spaced apart fingers;

said cover plate, formed of a flexible, deformable plastic

material having its outer surface contoured to generally coincide with the outer surface of the sanitary fixture when mounted thereto;

said plate having a flange which extends horizontally away from the inner surface of said plate, said flange being aligned with said space formed between said gripping fingers of said clip, said gripping fingers having means releasably latching said horizontal flange to hold said plate in fixed position; and

said latch means formed on said at least two gripping fingers, being in the form of a projection extending obliquely



upwardly and away from the end of each finger so that when said horizontal flange of said cover plate is inserted between said gripping fingers, said projections are imbedded therein to latch said plate in fixed position.

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**4,712,257**

## INVALID HOISTS

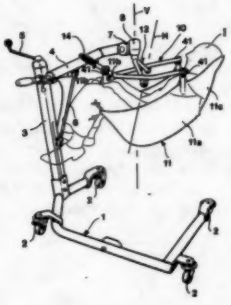
**David R. James, Tirley, England, assignor to Impro Limited, Gloucestershire, England**

**Filed Nov. 25, 1986, Ser. No. 934,786**

**Claims priority, application United Kingdom, Dec. 21, 1985, 8531561; Aug. 15, 1986, 8619894**

**Int. Cl.[4] A61G 7/10**

**U.S. Cl. 5—83** **14 Claims**



1. An invalid hoist comprising a lifting arm, a sling hanger support mounted at the outer end of said arm so as to turn about a rigid vertical bearing axis, a sling hanger which is a unitary construction supported by said sling hanger support so as to be pivotable about a horizontal axis relative to the sling hanger support, said sling hanger presenting spaced sling attachment points on both sides of said horizontal axis for connection of one pair of sling attachments to one side of the horizontal axis and for connection of a second pair of sling attachments to the opposite side of the horizontal axis, and means for locating said sling hanger in angular position about said horizontal axis and which allow the latter to be infinitely adjustable in position throughout an operative range of pivotal movement about said horizontal axis.

**4,712,258**

## BABY CHANGING MAT

**Harold J. Eves, 78 Fort Picklecombe, Maker, Near Torpoint, Cornwall, United Kingdom**

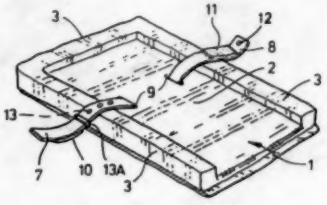
**PCT No. PCT/GB84/00283, § 371 Date May 15, 1985, § 102(e) Date May 15, 1985, PCT Pub. No. WO85/01197, PCT Pub. Date Mar. 28, 1985**

**Continuation of Ser. No. 740,042, May 15, 1985, abandoned. This PCT application Aug. 16, 1984, Ser. No. 942,956**

**Claims priority, application United Kingdom, Sep. 17, 1983, 832490**

**Int. Cl.[4] A47C 27/08**

**U.S. Cl. 5—424** **14 Claims**



1. A portable baby changing mat comprising a flexible padded body intended to be used on any flat substantially rigid horizontal surface and provided with means for resisting lateral movement of a baby lying on the upper, working surface of the mat, the mat further comprising a substantially rigid transverse stabilising member located below the said working surface of the mat and extending across the full width of the mat but with a limited extent along the length of the mat and fixed relative to the mat, the mat retaining longitudinal flexibility at all portions not coextensive with said stabilising member, the means for resisting lateral movement of a baby comprising straps attached to the mat to cooperate with the said stabilising member and arranged to be secured around the chest of the baby lying on its back on the mat to hold the baby on the mat, so that the baby is prevented from rolling the mat or itself over sideways by the combined action of the transverse stabilising member and the straps.

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**4,712,259**

## INFLATABLE TRAVEL PILLOW WITH CASE

**Moise Chiasson, 5326A Pierre Tétreault, Montreal, Quebec, Canada H1K 2Y9**

**Filed Apr. 8, 1987, Ser. No. 35,923**

**Claims priority, application Canada, Apr. 15, 1986, 506745**

**Int. Cl.[4] A47G 9/00**

**U.S. Cl. 5—441** **3 Claims**

1. A portable travel pillow comprising the combination of an inflatable pneumatic enclosure, a slipcover adapted to receive and contain the pneumatic enclosure when inflated, a wall of the slipcover comprising an opening formed with a closure and an envelope surrounding the opening, said envelope having dimensions suitable to receive the remainder of the slipcover

when the envelope is inverted through the opening and the slipcover stuffed into the opening and the deflated pneumatic enclosure stowed therewithin.

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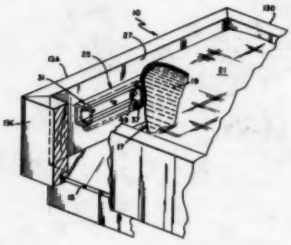
**4,712,260**
**WATERBED AND HOLDER ASSEMBLY FOR USE THEREWITH**

**Steve F. Bissel, 8 Robb Rd., Beverly, Mass. 01915**

**Division of Ser. No. 867,534, May 28, 1986, Pat. No. 4,683,602.**
**This application May 14, 1987, Ser. No. 49,554**
**Int. Cl.[4] A47C *27/08*; A47G *9/00***
**U.S. Cl. 5—451** **14 Claims**



1. A holder assembly for releasably securing an article of bedclothing to a waterbed frame, said holder assembly comprising:

a base member for being secured to said frame;

an expandable, resilient member having a first portion for being secured to said article of bedclothing and a second portion for being releasably secured to said base member;

first retention means for releasably securing said second portion of said expandable, resilient member to said base member, said first retention means including first and second cooperating adhesive materials for being releasably secured along a common surface thereof; and

second retention means for engaging said expandable, resilient member to retain said expandable, resilient member against said base member.

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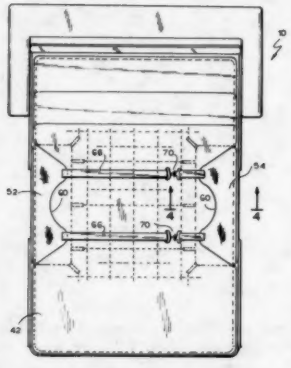
**4,712,261**
**MATTRESS GUARD**

**Bernard Castro, Ocala, Fla., assignor to Castro Convertible Corporation**

**Continuation of Ser. No. 714,164, Mar. 20, 1985, abandoned.**
**This application Apr. 27, 1987, Ser. No. 45,250**
**Int. Cl.[4] A47C *31/00***
**U.S. Cl. 5—499** **6 Claims**



1. A mattress guard for use in a convertible sofa bed mattress having a flat and a folded condition which is supported on a foldable frame to which a mattress support is secured and which is adapted to have bedding thereon, said mattress having an upper side and a lower side, said mattress guard comprising a pair of flexible mattress edge guard sheet members which adapted to be connected together when said bed is unfolded and to hold said bedding for the mattress securely against the mattress and prevent it from becoming entrapped in said folding mechanism when said bed is folded, each of said guard sheet members having first and second opposed edges, elastic means for resiliently interconnecting said first edges of said guard sheets on said upper side of the mattress in both said flat and folded conditions, said elastic means comprising two spaced apart pairs of opposed stretchable elastic straps with the first strap of each pair connected to the first edge of one guard sheet and the second strap of each pair connected to the first edge of the other guard sheet and releasable means respectively associated with each pair of straps for releasably connecting said first strap to said second strap of each of said pairs across the upper side of said mattress, said first opposed edges of said guard sheet members having a centrally disposed concave region between said elastic straps and means on said second edges for securing said second edges to said mattress support below the mattress.

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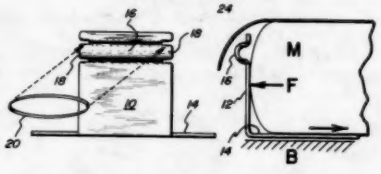
**4,712,262**
**BEDDING RETAINER**

**Frank Viggiano, East Greenbush, N.Y., assignor to FMR Corporation, Albany, N.Y.**

**Filed Jan. 20, 1987, Ser. No. 4,640**
**Int. Cl.[4] A47C *21/02***
**U.S. Cl. 5—508** **2 Claims**




1. A planar fabric retention apparatus for securing said fabric to the top surface of a liquid filled bladder comprising:

an "L" shaped semi-rigid bracket which has a detent projecting from the upper margin of the vertical leg in a direction essentially opposite the lower base leg; and

an elastic band to resiliently fit about said detent whereby a planar fabric passed over said detent may be captured thereon by affixing said band thereabout.

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**4,712,263**
**NEONATAL BLANKET**

**Catherine Pronzinski, 1390 Cadence Way, Santa Rosa, Calif. 95401**

**Filed Dec. 24, 1986, Ser. No. 946,305**
**Int. Cl.[4] A61G *11/00*; A47C *21/00*; A47D *15/00***
**U.S. Cl. 5—508** **7 Claims**

1. A blanket for a neonatal infant comprising:

a flexible, collapsible cover having a central cavity portion of a size to generally accomodate a neonatal infant, said central cavity having an inside surface; and

an edge portion for placement on a bedding surface, so that when said cover is placed over said infant, said edge rests upon said bedding surface, said central cavity inside surface does not contact said infant, and said cover forms a

barrier to convective air currents said blanket being segmented into at least two portions, so that one portion can

be removed from said bedding surface without the removal of the other.

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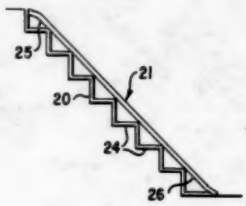
4,712,264

## MODULAR STEP RAMP

Thomas P. Voith, 666 Wall St., West Hempstead, N.Y. 11552

Filed Sep. 29, 1986, Ser. No. 912,821
Int. Cl.[4] E01D 1/00
U.S. Cl. 14—69.5 16 Claims




1. A stairway ramp comprised of a plurality of modules constructed to fit into right angular recesses as defined by the treads and risers of a set of stairway steps, each said module being used in pairs comprising tread and riser walls connected at their inner ends at a substantially right angle so as to abut the tread and riser of a respective step, means adapted to be traversed by a wheeled load and being connected with said tread and riser walls of the module at the upper ends thereof, and coupling means at least on one end of each module adjacent to one end of the said means adapted to be traversed for releasably connecting the module with another adjacent module of a stairway ramp.

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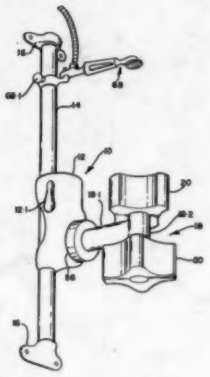
4,712,265

## DEVICE FOR CLEANING THE HUMAN BODY

Kenneth A. Williams, 217 Milner Rd., South Claremont, Cape Town, Cape Province, South Africa

Filed Jan. 21, 1986, Ser. No. 820,950
Claims priority, application South Africa, Jan. 24, 1985, 85/0584; Jun. 4, 1985, 85/4226
Int. Cl.[4] A47K 7/04
U.S. Cl. 15—97 R 10 Claims

1. A device for cleaning the human body, the device comprising a casing structure, drive means within the casing structure, first and second generally cylindrical cleaning pads for engagement with the body of a person using the device, said pads being spaced apart along a common longitudinal axis, each pad being of sponge and each having a series of axially extending circumferentially spaced ribs, the ribs of one pad being out of alignment with the ribs of the other pad, and



transmission means connecting the drive means to the cleaning means so that said pads are rotated about said common axis.

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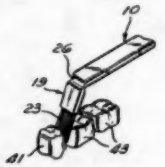
4,712,266

## WHISK PICK

Chikara Yamaki, Sendai, Japan, assignor to Fan Out Co., Ltd., Orange, Calif.

Continuation of Ser. No. 764,420, Aug. 9, 1985, abandoned. This application Dec. 23, 1986, Ser. No. 946,653
Int. Cl.[4] A46B 9/04
U.S. Cl. 15—167.1 9 Claims




7. An improved dental cleaning appliance in the nature of a toothpick having a single extruded plastic material linear member with a dental treatment device fabricated at each end of said member, wherein the improvement comprises:

a brush end formed at one end of the single extruded linear member; and

a neck formed in said linear extruded member adjacent to the brush end with the plastic material selected to permit the elastic bending of the single extruded member adjacent said brush end to a selective, fixed angular position,

whereby the toothpick-type appliance is provided with a bendable, brush device to assist in the cleaning ability of the dental appliance.

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4,712,267

## CONVERTIBLE TOOTHBRUSH

Peter S. C. Cheng, 5 Ross Street, Toronto, Ontario, Canada M5T 1Z8

Filed Dec. 4, 1986, Ser. No. 937,873
Int. Cl.[4] A46B 9/04
U.S. Cl. 15—172 17 Claims

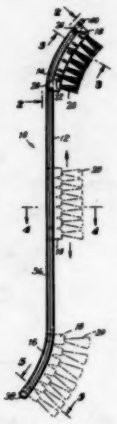
1. A convertible toothbrush, comprising:

an elongated handle of shape-retaining material and having a curved portion;

a flexible brush block for supporting bristles; and

means mounting the flexible brush block on the handle for

longitudinal movement along the elongation of the handle, said curved portion bending the flexible block and the



bristles supported thereon into a correspondingly curved configuration when the flexible block is moved onto the curved portion.

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**4,712,268**

**DEVICE FOR CLEANING UP FLOORS**

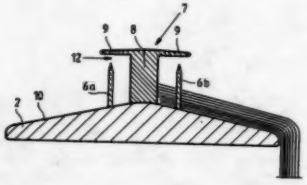
**Aaro Heinonen, SF-25460, Toija, Finland**

**Filed Apr. 22, 1986, Ser. No. 854,999**

**Claims priority, application Finland, May 15, 1985, 851946**

**Int. Cl.[4] A47L *13/20***

**U.S. Cl. 15—231** **4 Claims**



1. An apparatus for sweeping floors comprising:

a frame-part connectable to a stick;

at least two spikes mounted on the frame-part for detachably receiving a cleaning cloth by punching the cloth to the spikes; and

a protector for each spike for protecting the user from the spike and the spike from outside knocks, the protector comprising a shank attached to the frame-part and a spike protector connected to the shank near the point of the spike.

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**4,712,269**

**VEHICLE ICE SCRAPER HAVING DEFORMABLE BLADE**

**Billie C. Worthen, 362 Oak Tree Ct., Hoffman Estates, Ill. 60194**

**Filed Jun. 9, 1986, Ser. No. 871,681**

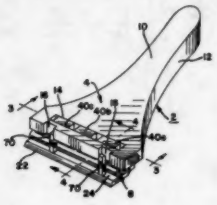
**Int. Cl.[4] B60S *3/04***

**U.S. Cl. 15—236 R** **6 Claims**

1. An ice scraper for the removing of ice from vehicle glass, comprising:

body means having a handle for gripping by a user, blade means carried by said body means and having a blade member forming a continuous scraper edge along one edge of said blade member,

said blade member having a second edge spaced from said one edge, said blade member having at least one cut out section positioned inward from said second edge and opening from said second edge, and



said at least one cut-out-section acting to permit said scraper edge to deform in conforming relationship to the curvature of the glass being contacted by said edge upon the application of pressure on said handle.

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**4,712,270**

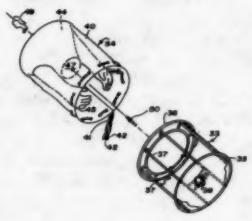
**BRAKE DRUM ENCAPSULATOR**

**Gary E. Palmer, Roselle, Ill., assignor to Hako Minuteman, Inc., Addison, Ill.**

**Filed Feb. 2, 1987, Ser. No. 9,837**

**Int. Cl.[4] A47L *5/14***

**U.S. Cl. 15—345** **7 Claims**



1. Apparatus for encapsulating brake drums comprising: a support stand; a frame having a generally open side wall and substantially open first and second ends; means for mounting said frame to said stand; a flexible cover having at least a continuous side wall of transparent, flexible, gas impermeable material, an open end for receiving said frame, and a continuous closed end wall of flexible material; means for drawing the open end of said cover about a brake assembly received in said cover and frame for substantially sealing said open end, said frame and cover being adapted to be coupled to means for evacuating the interior of said cover; the closed end wall of said cover having material of an area greater than the planar area thereof to permit back and forth as well as lateral motion within said apparatus; and means defining at least one glove integral with the closed end wall of said cover and adapted to receive at least one hand of an operator inside said cage for manipulating said drum assembly while permitting full vision of said drum assembly through said side wall.

4,712,271

## MOUNTING PLATE FOR A FURNITURE HINGE WHICH IS ADJUSTABLE IN HEIGHT

Günter Sundermeier, Bünde, Fed. Rep. of Germany, assignor to Paul Hettich GmbH & Co., Kirchkengern, Fed. Rep. of Germany

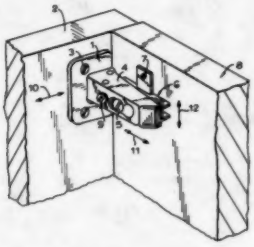
PCT No. PCT/DE85/00178, § 371 Date Jan. 3, 1986, § 102(e) Date Jan. 3, 1986, PCT Pub. No. WO86/00367, PCT Pub. Date Jan. 16, 1986

PCT Filed May 24, 1985, Ser. No. 844,354

Claims priority, application Fed. Rep. of Germany, Jun. 23, 1984, 8418939

Int. Cl.[4] E05D 7/04

U.S. Cl. 16—238 6 Claims



1. Mounting plate for a furniture hinge which is adjustable in height and has a hinge arm mountable on the mounting plate, the plate comprising an upper part (13) and a base plate (14) which is mountable on a furniture body, the base plate (14) engaging in a center area thereof in recesses (25) of the upper part and extending transversely to a longitudinal axis (20) thereof and being displaceably and lockably mounted therein, said base plate being formed with an abutment plate (21) which has front faces (23), said upper plate having an inner chamber, said abutment plate being received in said inner chamber, said front faces limiting an adjustment path of the upper part with respect to the base plate.

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4,712,272

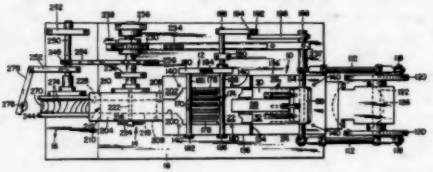
## PORTIONING, SHAPING AND DISPENSING APPARATUS

Arnold Soodalter, University Park Apts.-Apt. M-1, Easthampton Rd., Holyoke, Mass. 01040

Filed Dec. 16, 1986, Ser. No. 942,440

Int. Cl.[4] A22C 7/00

U.S. Cl. 17—32 2 Claims



1. Apparatus for portioning, shaping and dispensing a plurality of molded, spherically shaped meatballs comprising:

a food product entry area including a food product supply hopper and an interconnecting compression chamber for the containment and pressurizing of the food product,

sets of spaced interdigitating food product engaging fingers swingably mounted in the supply hopper for moving the food product into the compression chamber,

a pair of spaced wiper blades swingably mounted in the supply hopper for wiping food product from the hopper walls, compression means within the compression chamber comprising a trio of side-by-side compactors and a compactor carrier,

the compactors including a central compactor flanked by outside compactors all linked to the compactor carrier,

the central compactor being rigidly linked to the compactor carrier and the outside compactors being spring-loaded and mounted for reciprocatory movement relative to the compactor carrier,

the compression means pressurizing the food product within the compression chamber preparatory to and during the movement of the food product into a positioning area,

the portioning area including a drum rotatable confined within a housing and having a diametrically-disposed opening therethrough defining a pair of aligned radially-arranged pockets of alternately increasing and decreasing size according to the movement of a plug limitedly-reciprocable within the opening in the area intermediate the two pockets, the pockets of the drum each communicating through the houslng in seriatim first as a receiving pocket with the compression chamber for shaping, and measuring a charge of the food product loaded thereinto from the compression chamber responsively to the motivation of the compactors and second as a dispensing pocket with atmosphere for dispensing the shaped and portioned charge from the area into the shaping and dispensing area, with the compressing stroke of the compactor maintaining a tension on the food product during loading into the receiving pocket and therefollowing during a momentary dwell period as rotation of the drum out of register with the compression chamber is initiated folowing which the compactors are retracted in relieving stroke as the food product charged pocket is completely encapsulated by the cooperant drum and plug and housing is rotated into dispensing position as effected by the loading of the second-to-be-filled pocket and the resultant limited sliding movement of the plug within the drum opening,

the portioned food product exiting from the portioning area to the shaping and dispensing area,

the shaping and dispensing area comprising a grooved shaping wheel mounted for rotation relative to a grooved fixed shoe, the food product being deposited in the groove between the shaping wheel and fixed shoe for imparting a spherical shape thereto, with the resultant shaped article being dispensed into a suitable receiving means.

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4,712,273

## DEVICE FOR DELIVERING A PASTY STUFFING MATERIAL IN PORTIONS

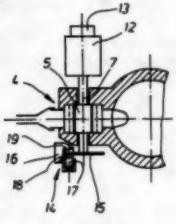
Wolfgang Wagner, Sonnentauweg 21, 2067 Reinfeld, Fed. Rep. of Germany

Filed May 16, 1986, Ser. No. 863,952

Claims priority, application Fed. Rep. of Germany, May 23, 1985, 3518529

Int. Cl.[4] A22C 11/04

U.S. Cl. 17—37 10 Claims



1. A device for delivering a pasty stuffing material in portions, comprising:

pressure generating means for charging said material with a static pressure;

an outlet channel for permitting said material to move under the influence of said static pressure;
shut-off and controlling means in said outlet channel;
said shut-off and controlling means including a vane rotor;
a motor connected to said vane rotor;
said motor being effective for urging said material through said vane rotor, whereby a controlling function is performed;
means for stopping said vane rotor; and
said vane rotor being effective for blocking a flow of said material through said outlet channel when said vane rotor is stopped, whereby a shut-off function is performed.

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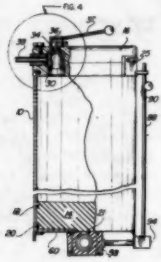
**4,712,274**
**SAUSAGE STUFFER**
**David C. Curtis, 411 E. Waverly, Arlington Heights, Ill. 60004**
**Filed Jul. 16, 1986, Ser. No. 886,107**
**Int. Cl.[4] A22C *11/06***
**U.S. Cl. 17—39** **12 Claims**



1. A vertically disposed, portable sausage stuffer apparatus, a housing comprising a cylinder open at one end, a piston in said cylinder movable by water pressure, means to control the action of the piston in said cylinder, a removable header for closing said open cylinder end, means to move the header, and a sausage stuffer tube positioned in said header and extending outwardly thereof, said cylinder having an open end and a closed bottom wall, spaced plates upwardly extending and secured to an upper end of said housing and extending beyond said open end for positioning said header, a plurality of depending, spaced legs secured to the lower end of said housing and having spaced apertures therein, wheels on a pair of said legs for portability, the other pair of legs being longer than the pair to which said wheels are attached to support the apparatus in vertical position.

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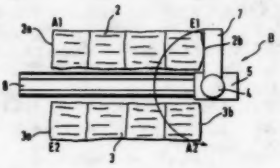
**4,712,275**
**METHOD FOR DRIVING A BALE OPENER**
**Fritz Hösel, Mönchengladbach; Hans-Jürgen Marx, and Josef Temburg, both of Jüchen, all of Fed. Rep. of Germany, assignors to Trützschler GmbH & Co. KG, Mönchengladbach, Fed. Rep. of Germany**
**Filed Sep. 19, 1984, Ser. No. 652,095**
**Claims priority, application Fed. Rep. of Germany, Sep. 26, 1983, 3334789**
**Int. Cl.[4] D01G *7/04***
**U.S. Cl. 19—80 R** **5 Claims**

1. In a method of operating a bale opener, including the steps of propelling a carriage of the bale opener in a path of travel to execute consecutive back and forth passes in a generally horizontal direction along and between two parallel fiber bale rows having opposite end faces defining a length boundary for each bale row; removing, during each pass, fiber tufts from the top of the fiber bales of one of the rows by an opening device suported laterally by a tower mounted on the carriage; the improvement comprising the step of turning, upon reaching the end of each pass, the tower through 180° about a generally vertical axis for swinging the opening device through 180° from above an end zone of one bale row to above an adjacent end zone of the other bale row such that the opening device,



during its swinging motion, remains substantially in its entirety within the end boundary of at least one of the bale rows.

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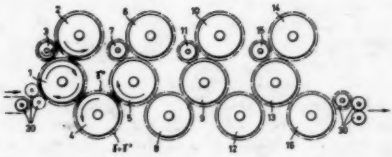
**4,712,276**
**CARDING ROLLER FOR PROCESSING STAPLE FIBERS**
**Peter Krusche, Aachen, Fed. Rep. of Germany, assignor to Hergeth Hollingsworth GmbH, Duelmen, Fed. Rep. of Germany**
**Filed Aug. 13, 1986, Ser. No. 900,040**
**Claims priority, application Fed. Rep. of Germany, Aug. 31, 1985, 3531151**
**Int. Cl.[4] D01G *15/02***
**U.S. Cl. 19—99** **10 Claims**



1. Carding roller apparatus of the type which includes a number of operative carding units each of which includes a plurality of rollers for processing staple fibers; wherein said operative carding units are arranged in tandem to provide a desired effect of the carding and levelling capacity; and each operational unit consisting of four rollers which cooperate with each other in the carding process which include a high speed roller, a working roller contacting said high speed roller at a carding point with fiber circulation, a stripper roller disposed in advance of the working roller in the travel direction of said rollers, a carding and transfer roller contacting the high speed roller at a carding point with fiber circulation and for assisting in the transfer of fibers from one said operative carding unit to an adjoining operative carding unit, said carding and transfer roller including a second carding point at the next adjoining operative carding unit with fiber circulation and an additional fiber storage volume between said first and second carding points to provide increased blending and levelling of fibers, and said working roller and high speed roller having generally equal diameters.

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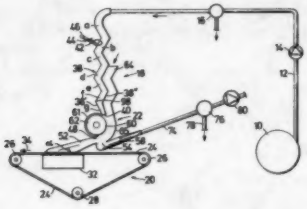
**4,712,277**
**METHOD AND APPARATUS FOR PRODUCING A CONTINUOUS WEB**
**Lennart Gustavsson, Växjö, Sweden, assignor to Fläkt AB, Nacka, Sweden**
**Filed Dec. 3, 1986, Ser. No. 937,562**
**Int. Cl.[4] D01H *5/00***
**U.S. Cl. 19—296** **22 Claims**

11. Apparatus for producing a continuous web of material including a preparatory station for fibers; a transport conduit for transporting a suspension of acceptable fibers and reject material in a carrier gas away from said preparatory station; a

distribution and delivery apparatus connected to said conduit to receive the flow of said suspension and incorporating in series, a transition part, a separator means, and a pair of alternative outlets comprising a reject outlet for receiving coarse particles and an accept outlet for accepting fine fibers; a distribution chamber connected to said accept outlet; a gas-permeable moving belt operable to pass through said chamber to receive said fine fibers in a continuous web thereon; and suction means in said distribution chamber underlying moving belt to carry away the carrier gas of said suspension;



said separator means including a convex surface having a curvature confronting the flow of said suspension, said transition part directing the suspension to flow tangentially along said convex surface and to follow the curvature thereof due to the Coanda Effect, said accept outlet being positioned downstream of said convex surface adjacent to said surface and said reject outlet being positioned radially outward from said surface, whereby the curved flow path of said suspension along said convex surface causes finer fibers to flow through said accept outlet and causes coarser reject particles to flow through the reject outlet.

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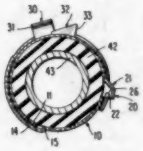
**4,712,278**

## EARLESS CLAMP STRUCTURE

**Hans Oetiker, Oberdorfstrasse 21, CH-8810 Horgen 2, Switzerland**

**Filed Oct. 22, 1986, Ser. No. 921,411**
**Int. Cl.[4] B65D *63/02***
**U.S. Cl. 24—20 TT** **21 Claims**



1. An earless clamp structure whose open ends are adapted to be mechanically interconnected, comprising clamping band means provided near its free ends with mechanical interconnecting means for mechanically interconnecting the free ends when the clamp structure is at least approximately in the installed condition, said mechanical interconnecting means including at least one cold-deformed support hook means pressed-out of the clamping band means near one end thereof and aperture means near the other end of the band means, said support hook means having abutment surface means operable to engage with the side of said aperture means extending transversely to the longitudinal direction of said band means and nearer the other end of said band means, and two further means in said band means each including tool-engaging surface means extending substantially transversely to said longitudinal direction for engagement with a clamp-tightening tool, one of said further means being located intermediate said support hook means and said one end and being in the form of substantially longitudinally extending tab-like means pressed-out of the band material of the band means and provided with said tool-engaging surface means on the side of said tab-like means opposite said one end, the other further means being located in the area of the side of said aperture means opposite said first-mentioned side, and said tab-like means being of such shape and so located in said band means as to be able to extend through said aperture means with movability in the circumferential direction to enable tightening of the clamp structure by applying mutually oppositely directed tightening forces at said tool-engaging surface means until said support hook means is able to engage with its abutment surface means at said side of the aperture means.

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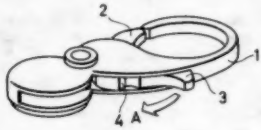
**4,712,279**

## CLASP FOR PERSONAL ORNAMENTS

**Mamoru Hiraishi, Hino, Japan, assignor to Heiwado Boueki Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 16, 1986, Ser. No. 907,913**
**Claims priority, application Japan, Jul. 18, 1986, 61-167829**
**Int. Cl.[4] A44B *13/00***
**U.S. Cl. 24—241 R** **4 Claims**



1. A clasp for personal ornaments comprising:
a hook shaped main body,
a closing piece pivotally mounted in the main body biased by a spring so as to close an opening thereof, said closing piece having a closing portion at one end thereof, an operating portion at the other end thereof, and an engaging portion intermediate of said closing portion and said operating portion, and
a locking member engaging said engaging portion at a position of said closing piece where said closing portion opens said opening of said main body and holding said closing piece at said position.

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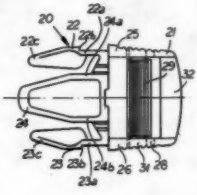
**4,712,280**

## STRAP FASTENER

**Gerhard Fildan, Dieselstrasse 20, D-7250 Leonberg, Fed. Rep. of Germany**

**Filed Apr. 22, 1986, Ser. No. 855,099**
**Int. Cl.[4] A41F *1/00***
**U.S. Cl. 24—625** **2 Claims**



1. A separable connector for two strap ends, comprising:
a socket member constituted as a flat body formed with an insertion opening at one side thereof subdivided into a central opening and a pair of lateral openings flanking said central opening, a central passage extending linearly into

said body from said central opening, and respective lateral passages each extending into said body from a respective one of said lateral openings and terminating in respective locking slits provided at opposite edges of said body; and

a plug member constituted with a flat body formed with a central guide tongue insertable through said central opening and guided into said central passage, and a pair of outer tongues flanking said central tongue and elastically deflectable inwardly toward said central tongue and insertable in said lateral openings and slidable in said lateral passages, said outer tongues having end formations engageable in said slits for impeding withdrawal of said plug member from said socket member, and wherein:

said central guide tongue has a generally V shape in a projection in a plane parallel to said members truncated at a free end of said central guide tongue and is formed with a shank having parallel edges at an opposite end of said central guide tongue connected to said body of said plug member, said parallel edges defining therebetween a maximum width of said tongue,

said lateral tongues each have shanks which extend generally parallel to said shank of said central guide tongue and terminate in end portions engageable with said parallel edges, said central tongue tapering in thickness from a region of said end portions to said free end,

said central passage is separated from each of said lateral passages by respective pairs of guide ribs formed on said body of said socket member and engageable with said plug member the guide ribs of each pair projecting toward one another from opposite ends of the socket member,

said pairs of guide ribs are spaced apart by a distance substantially corresponding to the spacing of said parallel edges from one another and at least equal to half of a width of the insertion opening of said socket member,

said body of said socket member is formed with a bar at a side thereof remote from the other body when the bodies are engaged with one another and defining therein a slot accommodating a respective strap end, and

said body of said plug member is provided with a window bordered by a movable bar and a fixed bar and forming a clamp element for another strap end received between the bars of said window.

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**4,712,281**

## NAPPED WARP-KNITTED FABRIC AND METHOD OF PRODUCING SAME

**Holger Scheller, Greensboro, N.C., assignor to Guilford Mills, Inc., Greensboro, N.C.**

**Filed Oct. 30, 1986, Ser. No. 925,716**
**Int. Cl.[4] D06C *13/08***
**U.S. Cl. 28—162** **10 Claims**

1. A method of producing a warp knitted fabric of at least two bar construction having a nappable surface on both the technical face and the technical back of said fabric, said method comprising:

providing a warp knitting machine having at least top, middle and bottom yarn guide bars with pile loop forming means mounted on said bottom bar;

warp knitting a set of ground yarns on said middle bar of said machine to form a fabric substrate;

simultaneously warp knitting a set of pile yarns on said top bar of said machine and over said pile loop forming means on said bottom bar to knit said pile yarns into said substrate in needle loops at the technical face of said fabric forming a first nappable surface and in elongated pile underlap loops at the technical back of said fabric forming a second nappable surface;

said underlap loops being nappable to produce a plush surface on the technical back of said fabric and being further adapted to be partially drawn sufficiently from the technical back of said fabric through said substrate to the technical face of said fabric into said needle loops upon napping of said needle loops to render said needle loops nappable to produce a plush surface at the technical face of said fabric of a comparable thickness to the technical back of said fabric; and

then napping at least one of said nappable surfaces.

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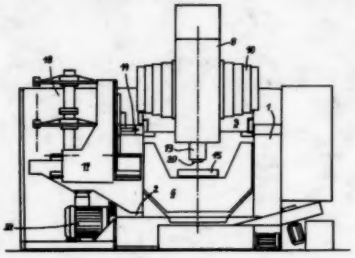
**4,712,282**

## MACHINE TOOL

**Ramon Romeu, La Ségarie, Saint-Jean-Lespinasse, 46 400 Saint-Cere, France**

**Filed Jul. 28, 1986, Ser. No. 889,955**
**Claims priority, application France, Jul. 26, 1985, 85 11457**
**Int. Cl.[4] B23B *7/00*; B23C *1/14***
**U.S. Cl. 29—27 C** **9 Claims**



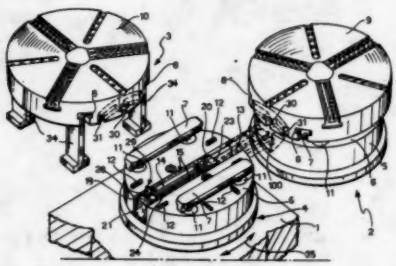
1. A machine tool comprising a frame having two strong uprights, guideways carried on the uprights, a general slide guidedly engaged in the guideways, a cradle, journals for mounting the cradle on the uprights to pivot about a horizontal first pivot axis, a plate for receiving and holding a workpiece to be machined, a driving shaft carrying the workpiece-holding plate and mounted on the cradle to rotate about a second axis which is fixed in translation relative to the cradle, machining means comprising turning tool means, support means, at least some of which support means are movable in three different directions in space, for supporting the machining means so that the machining means may be moved toward the plate in a wide range of inclinations of the cradle about the pivot axis, indexed driving means drivingly connected to one of the journals of the cradle so as to pivot the cradle about the horizontal pivot axis, a transmission extending through one of the journals of the cradle and drivingly connected to the shaft of the plate, and an exterior fixed power motor fixed relative to said frame and drivingly connected to said transmission for ensuring the power rotation of the driving shaft of the workpiece-holding plate.

4,712,283

## SYSTEMS INCLUDING AT LEAST ONE VERTICAL TURNING MACHINE OR THE LIKE AND AT LEAST TWO AUXILIARY STATIONS

Mario Bertorello, Turin, Italy, assignor to Rotomors S.p.A., Orbassano, Italy

Filed Feb. 19, 1985, Ser. No. 702,458
Claims priority, application Italy, Dec. 7, 1984, 68220 A/84
Int. Cl.[4] B23Q *41/02*
U.S. Cl. 29—33 P 12 Claims



1. In a system including at least one vertical turning machine or like machine tool and at least two auxiliary stations, respective pallets on which pieces being worked are mounted, each pallet having pairs of through grooves in its lower face on opposite sides of the corresponding diametral plane of symmetry and parallel to this plane, and pallet supports at the turning machine and the auxiliary stations, each pallet support having straight guides engageable by said through grooves of said pallets, at least one said pallet support having means for moving said guides, a device for moving the pallets between the guides of adjacent pallet supports, wherein said device includes:

a cursor mounted close to the upper face of at least one of the pallet supports and movable parallel to the respective guides along a path equidistant from said guides;

a T-shaped hook member projecting from said cursor;

means defining at least one radial slot in the lower face of a said pallet, starting from the periphery thereof, and arranged to receive the T-shaped member,

said slot having an inner end portion the width of which corresponds at least to that of the transverse head of the T-shaped member and the length of which is slightly greater than the thickness of said member, and

a drive mechanism for imparting movements to the cursor such as to move the T-shaped element between a starting position in which it is engageable with said slot of the pallet when the latter is located on the pallet support and a final position in which the pallet is located on and centered relative to one of the adjacent pallet supports, said drive mechanism including

a double-acting hydraulic cylinder fixed to the bottom of a diametral through seat formed in the upper face of the pallet support,

a piston shaft projecting from said cylinder,

a pair of identical chains carrying said cursor pairs of coaxial sprockets over which said chains pass, one of said sprocket pairs being located close to one end of said seat;

the sprockets forming part of a carriage, a part of said carriage opposite the said end of the seat being fixed to the end of the piston shaft of said hydraulic cylinder, and

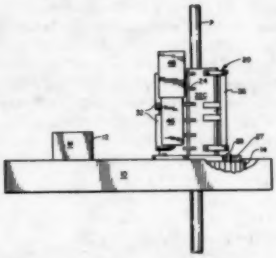
the lower passes of said chains being fixed to the body of the hydraulic cylinder close to the end of the cylinder from which the piston shaft projects.

4,712,284

## POWER TONGS WITH HYDRAULIC FRICTION GRIP FOR SPECIALITY TUBING

William E. Coyle, Sr., Houma, and Dennis J. Penisson, Raceland, both of La., assignors to Bilco Tools Inc., Houma, La.

Filed Jul. 9, 1986, Ser. No. 886,195
Int. Cl.[4] B25B *13/50*
U.S. Cl. 29—240 9 Claims



1. In a power tongs for well pipe, having a rotary head with plural jaws mounted thereon for movement radially with respect to the pipe, the improvement comprising

an air-driven pump for hydraulic fluid mounted on the rotary head,

an expansible chamber motor mounted on the rotary head for driving at least one of the jaws radially inward against the pipe when hydraulic fluid under pressure from said pump is applied thereto,

pressure controlling means operatively connected between said pump and said expansible chamber motor, whereby jaw force can be controlled independent of tongs torque, and

a quick-connect fitting for temporarily connecting said air-driven pump to an external compressed air line in order to pressurize the expansible chamber motor and thus clamp the pipe between the jaws, and

check valve means between said pump and said expansible motor permitting fluid to flow only in the direction of the latter, so that the line can thereafter be disengaged from the pump, thereby permitting unlimited rotation of the tongs head.

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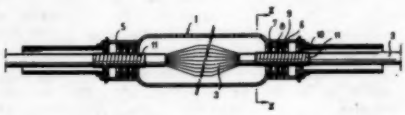
4,712,285

## METHOD FOR ACHIEVING FLUID-TIGHTNESS OF A PLASTIC SLEEVE FOR PROTECTING SPLICES OF ELECTRIC CABLES OR TELEPHONE CABLES

Jacques Morel, Le Moulin du Roi, and Didier Morel, Favières, both of France, assignors to Etablissements Morel - Ateliers Electromecaniques de Favieres, Chateauneuf en Thymerais, France

Filed Mar. 11, 1986, Ser. No. 838,598
Int. Cl.[4] B21D *39/02*
U.S. Cl. 29—458 2 Claims



1. A method for forming a tight seal between two half-shells (*1a*, *1b*) to be assembled together along their adjacent edges (*2a*, *2b*) according to a plane of assembly (M), comprising providing two half-shells (*1a*, *1b*), the edge (*2a*) of one half-shell (*1a*) being provided with a longitudinal rib (**12**) to be engaged within a groove (**13**) formed in the edge (*2b*) of the

other half-shell (1*b*), said groove (13) having an inner side wall (14) of sufficiently small thickness to be flexible, the height (H) of the rib (12) to be engaged in said groove being slightly smaller than the depth (P) of the groove, the rib (12) having a face (12*a*) adjacent to the interior of said one half-shell (1*a*), the inner face (14*a*) of said flexible wall (14) forming with said inner face, when said rib is engaged into said groove, an angle (a) of a few degrees having a vertex (15) located at the extremity of said wall, the faces (17, 18) of the rib (12) and of the groove (13) which are opposite to the flexible wall (14) being applied against each other substantially perpendicular to the plane of assembly (M) of the two half-shells (1*a*, 1*b*), said method comprising the steps consisting in:

applying a flat strip of putty (16) against the inner face (14*a*) of the flexible wall (14) of said other half-shell (1*b*), the thickness of the strip of putty (16) being at least equal to the distance (d) between the summit (12*b*) and the rib (12) and the inner face (14*a*) of the flexible wall (14) when said rib is fully engaged in the groove,

engaging the rib (12) into the groove (13),

applying the two half-shells (1*a*, 1*b*) tightly against each other along the plane of assembly (M) and,

putting under pressure the interior of the sleeve formed by said assembled two half-shells.

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**4,712,286**

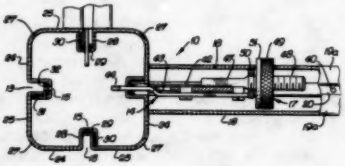
## METHOD FOR MAKING MERCHANDISING DISPLAY MEMBERS

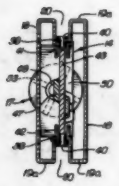
**Morris A. Wolf, 7048 Macapa Dr., Los Angeles, Calif. 90068**

**Continuation-in-part of Ser. No. 496,260, May 19, 1983, Pat. No. 4,607,754. This application Jul. 25, 1986, Ser. No. 889,500**

**Int. Cl.[4] B21D** *39/02*

**U.S. Cl. 29—463** **10 Claims**





1. The method of forming an elongated hollow structural member having a preselected cross-sectional shape and a decorative outer side having longitudinal grooves therein formed with slotted inner walls, comprising the steps of:

providing a supply of elongated, generally flat strip material having a prefinished decorative surface on one side;

forming a plurality of sections of said strip material each having longitudinal bends to form a side portion of said structural member and having connecting portions along it longitudinal edges, including the bending of a central portion of said strip material longitudinally to form an outside corner, and the bending of the edge portions of the strip material longitudinally to form a generally U-shaped channel along one edge portion having a bottom wall, and an offset foot along the other edge portion, shaped to extend into the channel of an adjacent section and abut against the bottom wall of the channel thereof;

fitting said sections together to form the hollow tubular structure with the connection portions thereof overlapping and with said feet in said channels thereby to define the longitudinal grooves;

forming slots through said feet and said bottom walls spaced apart along the inner walls of said grooves;

and securing the connecting portions together to form said member with said preselected cross-sectional shape.

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**4,712,287**

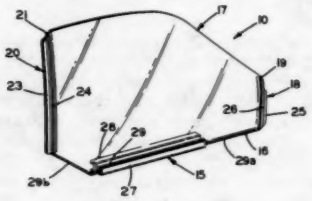
## METHOD OF ASSEMBLING A VEHICLE FROM MODULAR COMPONENTS

**Norman W. Johnston, Perrysburg, Ohio, assignor to Libbey-Owens-Ford Co., Toledo, Ohio**

**Filed May 23, 1986, Ser. No. 866,446**

**Int. Cl.[4] B23P** *25/00*

**U.S. Cl. 29—469** **31 Claims**



1. A method of assembling a vehicle from a vehicle body and a plurality of modular window assemblies comprising the steps of:

(a) positioning a sheet of transparent material within the interior of a mold chamber formed by at least two cooperating mold sections;

said mold sections provided with a gasket shaping portion which cooperates with a first peripheral portion of the sheet to define a first gasket forming cavity corresponding to a first gasket member to be formed and cooperates with a second peripheral portion of the sheet to define a second gasket forming cavity corresponding to a second gasket member to be formed;

(b) inserting a plug between said first and second cavities;

(c) injecting into the first and second gasket forming cavities a composition which is capable of polymerization when cured and, when cured in contact with the sheet, it adheres thereto to produce the first and second gasket members by injecting said composition into one of said first and second gasket forming cavities, removing said plug and then injecting said composition into the other one of said first and second gasket forming cavities;

(d) removing the sheet and the first and second gasket member as a modular window assembly from the mold chamber;

(e) repeating at least steps (a), (c) and (d) to produce a plurality of modular window assemblies; and

(f) attaching said plurality of modular window assemblies to a vehicle body to assemble a vehicle.

4,712,288

## SPARK ERODER WITH FIXED MACHINE TABLE AND LOWERABLE WORKING CONTAINER FOR THE DIELECTRIC

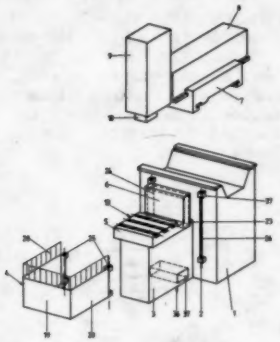
Attilio Lodetti, and Hansueli Blaser, both of Losone, Switzerland, assignors to AG fur industrielle Elektronik AGIE Losone b. Locarno, Losone, Switzerland

Filed Dec. 4, 1985, Ser. No. 805,152

Claims priority, application Fed. Rep. of Germany, Dec. 5, 1984, 3444390

Int. Cl.[4] B23P *13/00*

U.S. Cl. 29—557 17 Claims



1. A spark erosion machine comprising a machine upright; a fixed machine table disposed on a front side of the machine upright; a machine table plate attached to the machine table; a working container for containing dielectric fluid having a plurality of walls and a bottom and comprising a fixed component and at least one movable component, wherein the fixed component includes the machine table plate to form at least a portion of the bottom of the working container and a substantially vertical wall element attached to the machine table plate at a rear portion thereof to form at least a portion of that one of said walls of the working container which is disposed nearest to the machine upright.

4,712,289

## INSTALLATION FOR THE AUTOMATIC GRINDING OF CURVED SURFACES

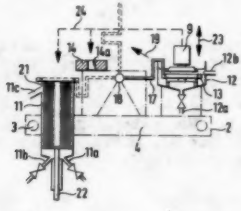
Wolfgang Stamm, Puchheim, and Dieter König, Munich, both of Fed. Rep. of Germany, assignors to Bayerische Motoren Werke Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Aug. 5, 1985, Ser. No. 762,676

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1984, 3430856

Int. Cl.[4] B23Q *3/157*

U.S. Cl. 29—568 32 Claims



1. An installation for the automatic grinding of surfaces, especially of body surfaces to be painted, comprising a grinding aggregate including a rotating grinding wheel operatively connected with a grinding spindle means by way of a universal joint and a grinding disk interchangeably secured at the rotating grinding wheel, the grinding aggregate being machine-guided during its operation, a grinding disk magazine means, means for automatically exchanging at the grinding wheel a used-up grinding disk for a new grinding disk, and clamping means for securing the rotating grinding disk at the grinding wheel, said clamping means being relatively rotatable with respect to the grinding wheel and enabling an automatic exchange of the grinding disk.

4,712,290

## TEXTILE AND METHOD OF MANUFACTURE

James N. Lindsey, Sylacauga, Ala., assignor to Avondale Mills, Sylacauga, Ala.

Filed Jul. 28, 1986, Ser. No. 890,939

Int. Cl.[4] D06L *1/14;* D06M *16/00*

U.S. Cl. 28—178 15 Claims

1. A method for treating a stiffened fabric to permit ready softening of garments manufactured therefrom, the fabric having been stiffened by the addition of at least 4% by weight corn starch and at least 0.4% by weight of a wax having a melting temperature below 150° F., said method comprising the steps:

of introducing into said fabric at least 0.25% by weight of a non-ionic wetter/rewetter; and

introducing into said fabric at least 0.5% by weight of at least one enzyme capable of decomposing corn starch while leaving said fabric essentially unaffected.

4,712,291

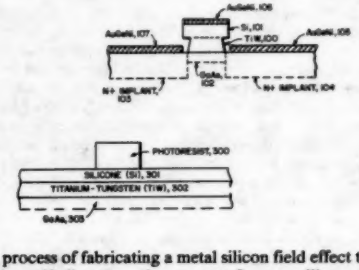
## PROCESS OF FABRICATING TIW/SI SELF-ALIGNED GATE FOR GAAS MESFETS

William V. McLevige, Plano, Tex., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jun. 6, 1985, Ser. No. 741,643

Int. Cl.[4] H01L *21/283*

U.S. Cl. 437—27 11 Claims




1. A process of fabricating a metal silicon field effect transistor with a self-aligned mushroom gate from a gallium arsenide wafer, said self-aligned mushroom gate having a lower layer and a top layer, said lower layer being formed from titanium-tungsten and said top layer being formed from silicon, said process comprising the steps of:

forming an enhancement implanton the top surface of said gallium arsenide wafer;

depositing a coating of titanium-tungsten on the top surface of said gallium arsenide wafer;

forming a doped coating of silicon on the top surface of said coating of titanium-tungsten;

forming said top layer of said self-aligned mushroom gate over the center of said top surface of said gallium arsenide wafer from said doped coating of silicon;

forming said lower layer of said self-aligned mushroom gate from said coating of titantium-tungsten;

doping with selected donor implants all areas of the top surface of said gallium arsenide wafer which are not cov-

ered by said self-aligned mushroom gate, said selected donor implants being selected from materials, including sulfur, which will diffuse laterally upon annealing;

activating said selected donor implants by annealing them so that they diffuse laterally and reduce any spacing between the donor implants and the lower layer of the self-aligned mushroom gate; and

applying source/drain ohmic contacts to the top surface of said self-aligned ohmic gate and said donor implants on said gallium arsenide wafer.

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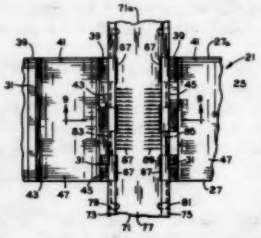
**4,712,292**

## METHOD OF ASSEMBLING A STATIONARY ASSEMBLY FOR A DYNAMOELECTRIC MACHINE

**James L. King, Holland, Mich., assignor to General Electric Company, Fort Wayne, Ind.**

**Filed Oct. 12, 1984, Ser. No. 660,101**
**Int. Cl.[4] H02K *15/00***
**U.S. Cl. 29—596** **29 Claims**



1. A method of assembling a stationary assembly for a dynamoelectric machine, the stationary assembly having a core helically wound from a lanced strip of generally thin ferromagnetic material having a pair of opposite edges, a pair of opposite end faces on the core defining the axial length of the core, a plurality of spaced apart grooves in the lanced strip each having a pair of opposed sidewalls intersecting one of the opposite edges of the lanced strip and a base wall between the opposed sidewalls spaced from the one opposite edge of the lanced strip and with the grooves extending generally in axial row formation between the opposite end faces of the core, and a plurality of lands on the one opposite edge of the lanced strip intersecting with adjacent opposite sidewalls of the grooves in the lanced strip and extending generally in row formation between the opposite end faces of the core, respectively, and a set of beams with each beam including an intermediate portion interposed between a pair of opposite end portions and with the intermediate and opposite end portions being defined at least in part by a pair of opposite sidewalls integrally intersecting with a cross wall, a set of openings extending through the opposite sidewalls at least adjacent the intersections of the opposite sidewalls with the cross wall and at least in part within the intermediate portion, and a set of opposite marginal edges on the cross wall adjacent the openings and at least in part within the intermediate portion, respectively, the method comprising the steps of:

placing the intermediate sections of the beams at least in part within preselected ones of the grooves and extending the opposite end portions of the beams generally axially beyond the opposite end faces of the core, respectively;

disposing a part of the opposite sidewalls of the beams within the intermediate sections thereof at least adjacent the opposed sidewalls of the preselected ones of the grooves and seating the cross walls of the beams within the intermediate sections thereof at least in part in engagement with the base walls of the preselected ones of the grooves during the placing and extending step, respectively;

positioning the openings in the opposite sidewalls of the beam and the opposite marginal edges on the cross wall of the beams at least adjacent the opposed sidewalls of the preselected ones of the grooves during the disposing and seating step; and

displacing from the core a set of opposed sections including at least a part of the opposed sidewalls of the preselected ones of the grooves into overlaying engagement with confronting parts on the cross walls of the beams at least adjacent the openings and into abutting engagement with the opposite marginal edges on the cross walls of the beams and retaining thereby the beams against displacement from the preselected ones of the grooves.

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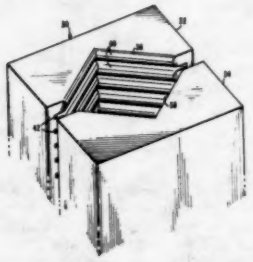
**4,712,293**

## METHOD FOR SECURING A SLOW-WAVE STRUCTURE IN ENVELOPING STRUCTURE WITH CRIMPED SPACERS

**Arthur E. Manoly, Rancho Palos Verdes, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Nov. 28, 1986, Ser. No. 935,871**
**Int. Cl.[4] H01P *11/00*; H01Q *13/00***
**U.S. Cl. 29—600** **15 Claims**



1. A method for securing a slow-wave structure for a traveling-wave tube within an enveloping structure comprising the steps of:

attaching a plurality of longitudinally disposed dielectric rods to the outer surface of said slow-wave structure to form a subassembly,

mounting said subassembly within an enveloping structure comprising a plurality of annular non-magnetic spacer elements respectively interposed between and abutting a plurality of annular ferromagnetic disks, said spacer elements and said disks being coaxially disposed with the inner surfaces of said spacer elements and said disks defining a cylindrical surface of a diameter sufficient to receive said subassembly, and

applying plastically deforming force to the outer surface of said spacer elements to crimp said spacer elements onto said dielectric rods and thereby firmly hold said subassembly within said enveloping structure.

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**4,712,294**

## METHOD OF FORMING A HELICAL WAVE GUIDE ASSEMBLY BY PRECISION COINING

**George M. Lee, Redondo Beach, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Continuation of Ser. No. 789,882, Oct. 21, 1985, abandoned.**
**This application Feb. 24, 1987, Ser. No. 18,852**
**Int. Cl.[4] H01P *11/00*; B23P *11/00***
**U.S. Cl. 29—600** **5 Claims**

1. The method of securing a slow-wave structure in the barrel of a traveling-wave tube comprising the steps of:

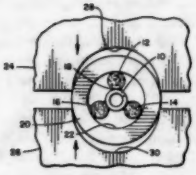
mounting a helical slow-wave structure between at least three support rods having a circumscribing circular dimension;

placing the helical slow-wave structure with its support rods into a tubular barrel having an interior diameter greater

than the diameter of said circumscribing circular dimension;

inserting the tubular barrel within a die having opposing faces which when the die is closed define a right circular cylinder of a diameter slightly less than the initial outer diameter of the barrel; and

closing the die to directly coin the barrel around the support



rods such that the interior size of the barrel is reduced to a diameter less than that of said circumscribing circular dimension to engage the support rods which in turn resiliently compress and deform without axially elongating or changing the pitch of the helical slow-wave structure such that the compressed helical slow-wave structure maintains a return force on the rods to firmly hold the helical slow-wave structure and the support rods within the barrel.

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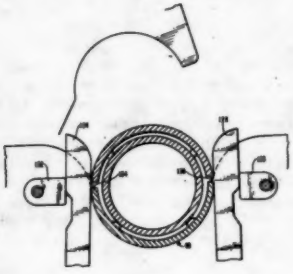
**4,712,295**

## CLAMP APPARATUS

**Camille Peele, Pikeville, N.C.; Jon W. Harwood, Toledo, Ohio, and Peter L. Resuggan, Goldsboro, N.C., assignors to AP Industries, Inc., Toledo, Ohio**

**Division of Ser. No. 790,737, Oct. 24, 1985, Pat. No. 4,656,713.**
**This application Sep. 8, 1986, Ser. No. 904,943**
**Int. Cl.[4] B23P *19/00*; B25B *27/14*; B21D *39/00***
**U.S. Cl. 29—700** **9 Claims**



1. A clamp assembly for positioning two longitudinal halves of a pipe in proximity to one another, said clamp assembly comprising a plurality of clamp apparatus at spaced apart locations and disposed relative to one another for receiving the longitudinal halves of the pipe, each said clamp apparatus comprising:

a first support having a recess therein for receiving the first half of the pipe;

gripping means for securely urging the first half of the pipe into the recess of the first support; and

a second support for urging the second longitudinal half of the pipe into alignment with the first longitudinal half thereof.

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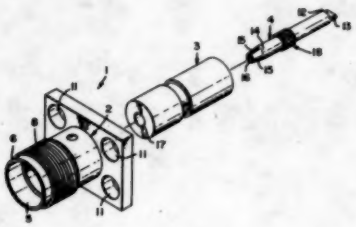
**4,712,296**

## METHOD OF CONSTRUCTING A COAXIAL CONNECTOR

**Edgar W. Forney, Jr., Harrisburg, and Richard S. Hogendobler, Camp Hill, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Division of Ser. No. 765,617, Aug. 14, 1985, Pat. No. 4,662,703.**
**This application Jan. 6, 1987, Ser. No. 704**
**Int. Cl.[4] H01B *13/20***
**U.S. Cl. 29—828** **7 Claims**



1. A method of constructing an electrical connector, wherein the connector has a conductive outer shell for releasable connection with an electrical cable, a dielectric body coaxially surrounded by the outer shell, and a conductive electrical contact coaxially surrounded by the dielectric body and having an electrical contact portion for releasable connection with the cable, comprising the steps of:

assembling the contact concentrically within the dielectric body,

coaxially surrounding a roughened outer surface portion of the contact with an interior surface portion of the dielectric body,

heating a portion of the contact,

heating the continuous interior surface portion of the dielectric body to a fluid state and into flowed interlocked engagement with the roughened surface portion, and

assembling the outer shell concentrically over the dielectric body.

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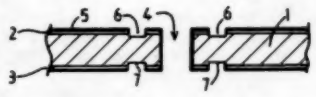
**4,712,297**

## METHOD OF MANUFACTURING SUPPORTS FOR ELECTRICAL CIRCUITS

**Claude J. Wolfram, 11, rue Victor Nessler, Strasbourg, France 67000**

**Filed Sep. 18, 1986, Ser. No. 908,676**
**Claims priority, application France, Sep. 18, 1986, 85 13803**
**Int. Cl.[4] H01K *3/10***
**U.S. Cl. 29—852** **2 Claims**



1. Method of manufacturing supports for electrical circuits, comprising the steps of applying a conductive coating to both sides of a board, drilling holes in the coated board, causing a discontinuity in the electrical conductivity around at least some of said holes on at least one side of said board to prevent

electrolytic deposition on the walls of said at least some holes and depositing a conductive material at predetermined positions by electrolytic means.

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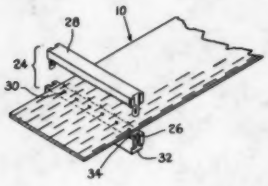
**4,712,298**

## FLAT WOVEN CABLE FOR INSULATION DISPLACEABLE CONNECTOR TERMINATION AND METHOD

**Edward J. Mondor, III, Greenville, S.C., assignor to Woven Electronics Corporation, Mauldin, S.C.**

**Continuation-in-part of Ser. No. 830,725, Feb. 19, 1986. This application May 16, 1986, Ser. No. 863,967**
**Int. Cl.[4] H01R *4/66***
**U.S. Cl. 29—861** **14 Claims**




1. A method of producing a flat woven electrical transmission cable which transmits electrical signals of the type which includes a plurality of insulated signal conductors having a conductor wire surrounded by insulation extending longitudinally in a warp direction in said cable, and weft elements interwoven with said signals conductors in said woven cables, wherein the method comprises:

weaving polymeric warp strand means in said woven cable between said signal conductors laterally spacing said signal conductors across the cable,

inserting an insulation displaceable connector having a plurality of connector prongs into said woven cable to pierce and displace the insulation of said signal conductors and make electrical contact with the conductor wire of said signal conductors; and

providing said polymeric warp strand means in a form having an outer covering of pliable polymeric material which readily yields to accept penetration of said connector prongs into said woven cable without bending of said prongs for reliable insulation displacement and electrical contact with said signal conductors.

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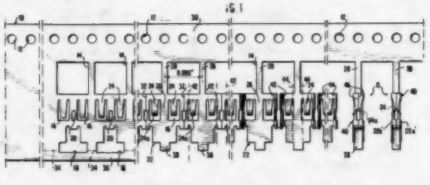
**4,712,299**

## PROCESS FOR PRODUCING ELECTRICAL CONTACTS FOR FACILITATING MASS MOUNTING TO A CONTACT HOLDER

**Heinz Loewen, Gardena, and Wold Wenko, Pasadena, both of Calif., assignors to Electronic Plating Service, Inc., Gardena, Calif.**

**Filed Feb. 21, 1986, Ser. No. 831,691**
**Int. Cl.[4] H01R *43/04***
**U.S. Cl. 29—882** **4 Claims**



1. In a process of making a series of standard size contacts from flat strip metal stock while commonly joined thereto, comprising steps of:

advancing said flat strip metal stock;

removing material from said strip metal stock to form a carrier strip and integrally, a plurality of laterally separated blanks, and

bending sequentially portions of said blank to cause said blank to form a female contact portion of generally tubular form;

the improvement comprising:

stamping said blanks on centers such that the lateral width of each blank forming said tubular contact portion is less than the width of the strip metal stock material necessary to complete a standard size tubular contact portion; and

thinning at least a portion of each blank, subsequent to forming said blanks to increase the effective overall width of the blank tubular contact material to permit completion of a tubular contact portion of standard size whereby the tubular contact portions can be commonly mounted simultaneously to a support having respective uniformly spaced contact receiving and mounting means on centers equal to, a multiple of, or a fraction of said centers for said blanks thereby permitting initial severing of said strip to form each blank narrower than that the required width to achieve a tubular contact portion of standard size, while minimizing waste of strip metal stock material during contact fabrication.

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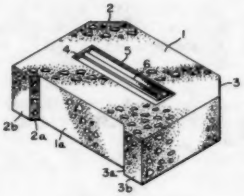
**4,712,300**

## SPONGE-BLOCK SAFETY RAZOR HOLDER

**George T. Hemmeter, 4125 Black Point Rd., Honolulu, Hi. 96816**

**Filed Oct. 20, 1986, Ser. No. 920,417**
**Int. Cl.[4] B26B *19/44***
**U.S. Cl. 30—41** **5 Claims**




1. A safety razor blade holder constructed of a block of sponge material which is semi-stiff when dry and flacid when wet, said sponge-block supports a conventional razor-blade assembly having at least one cutting blade implanted within said sponge block with the cutting edge of said at least one blade located on or slightly below a plane established by the surface of the sponge-block oriented and to shave when said sponge-block with said at least one blade is pressed lightly on the skin until the cutting edge of the blade or blades are in contact with the skin and stroked in the direction of cutting or shaving.

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**4,712,301**

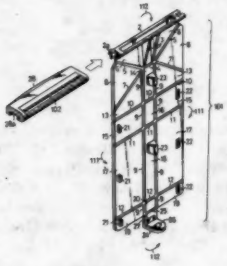
## SAFETY RAZOR

**Tatsuya Saito, Seki, Japan, assignor to Kai Cutlery Center Co., Ltd., Gifu, Japan**

**Filed Jul. 18, 1983, Ser. No. 514,588**
**Int. Cl.[4] B26B *21/00***
**U.S. Cl. 30—47** **8 Claims**

1. A safety razor comprising a blank having a plurality of transverse and longitudinal bending lines defined thereon, said blank being foldable selectively around selected ones of said bending lines into a razor handle of a rectangular cross section and around other bending lines than said selected ones into a

box-shaped case, a blade holder mount integrally formed with an upper edge of said blank, and a blade holder separate from and adapted to be mounted on said blade holder mount, said blade holder being accommodatable in said case and having a blade mounted thereon, said bending lines include a central transverse bending line extending transversely in an upper portion of said blank, two pairs of upper and lower oblique bending lines extending from opposite ends of said central transverse bending line obliquely upwardly and downwardly, respectively, toward transverse edges of said blank, a pair of longitudinal bending lines extending from said opposite ends of said central transverse bending line toward a lower edge of said blank, and three transverse bending lines extending fully across said blank below said pair of lower oblique bending lines, said blank including a pair of upper triangular blade holder supports defined between said pair of upper oblique bending lines and said upper edge of said blank, a pair of lower triangular blade holder supports defined between said upper and lower oblique bending lines and said transverse edges of said blank, and a plurality of central and side walls defined between said central transverse bending line, said lower oblique bending lines, and said longitudinal and transverse bending lines, the arrangement being such that when said side walls are bent forward around said pair of longitudinal bending



lines, said upper blade holder supports are tilted forward along said central transverse bending line and said upper oblique bending lines, and said lower blade holder supports are spread obliquely forward along said lower oblique bending lines, thereby allowing said plurality of walls to constitute a razor handle, and when said blank is folded forward around said three transverse bending lines, said upper and lower blade holder supports and said plurality of walls jointly constitute a case in which said blade holder and said blader holder mount are accommodated, said blank has a pair of rectangular lids projecting forward from said transverse edges in transverse alignment with the walls defined by said longitudinal bending lines and intermediate and lower transverse bending lines of said three transverse bending lines, said lids serving as side walls of said case when said blank is folded along said three transverse bending lines, said lids can overlap each other to provide a front side wall of said razor handle when said blank is folded along said longitudinal bending lines, a plurality of engagement plates mounted on inner surfaces of said lids and detachably engageable with each other when said lids overlap each other, wherein one of said engagement blades has a pair of locking ledges respectively on opposite surfaces thereof, and the other engagement plates have a recess defined therebetween for engagement therein of said locking ledges.

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**4,712,302**

## TUBE CUTTER WITH RELEASABLE DRIVE

**Charles E. Diller, Springfield, Ohio, assignor to Dresser Industries, Inc., Dallas, Tex.**

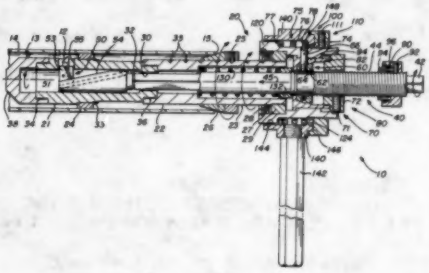
**Filed Aug. 29, 1986, Ser. No. 902,439**
**Int. Cl.[4] B26D *3/16***
**U.S. Cl. 30—107** **14 Claims**

1. A tube cutter of the type which forces a tool bit against an interior tube wall as said bit is rotated to sever said tube from the inside, said tube cutter comprising:

a. a housing for holding said tool bit at a distance from said tube end as said tool bit is rotated;

b. a feed shaft means positioned by said housing for converting axial force along said feed shaft into radially directed pressure forcing said tool bit outwardly against said interior tube wall at said distance from said tube end as said tool bit is rotated;

c. a drive means positioned by said housing for releasable



driving engagement with said feed shaft means, said drive means having a released non-feed position and an engaged feed position in which axial force is applied to said feed shaft means;

d. means positioned by said housing for actuating said drive means between said released position and said engaged position; and

e. means positioned by said housing for limiting the maximum axial force applied by said drive means to said feed shaft means so that the maximum radial force on said tool bit is limited.

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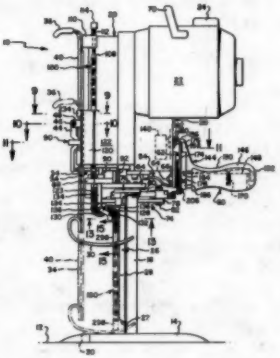
**4,712,303**

## STRAIGHT KNIFE MACHINE WITH SAFETY FEATURES

**Robert C. Barrett, Angola, N.Y., assignor to Eastman Machine Company, Buffalo, N.Y.**

**Filed Feb. 11, 1985, Ser. No. 700,721**
**Int. Cl.[4] B26B *7/00***
**U.S. Cl. 30—275** **25 Claims**



25. In a cutting machine comprising a housing having a base spaced therefrom, a motor carried by said housing, a knife blade having a cutting edge and carried by said housing for reciprocal movement along a plane generally normal to said

base in response to operation of said motor, and presser foot means movably carried by said housing located in spaced relation to said blade cutting edge and movable toward and away from said base, the improvement comprising:

a single elongated guard operatively connected to said presser foot means and located closely adjacent said blade cutting edge and guidedly supported in said housing for movement along said blade edge into and out of guarding relation to said blade edge in response to movement of said presser foot means toward and away from said base, said guard being flexible and travelling along a path having a first portion closely adjacent said blade cutting edge, a second portion offset from said first portion generally parallel thereto and located in said housing and a third portion joining said first and second portions, said first, second and third portions of said path being located substantially in a plane parallel to said plane of said blade.

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**4,712,304**

## KNIFE HAVING A HANDLE COATED WITH AN ELASTOMER, PARTICULARLY FOR PROFESSIONAL USES

**Danilo Sanelli, Via Roma, 1, Premana, Como, Italy**

**Filed Jul. 31, 1985, Ser. No. 761,229**
**Claims priority, application Italy, Sep. 26, 1984, 23329/84[U]**
**Int. Cl.⁴ B25G *3/00***
**U.S. Cl. 30—343** **9 Claims**

1. A knife for professional application comprising a cutting blade (1) having a shank (2), a handle in the form of a body (3) of synthetic plastic material in which said shank is buried, and a layer of an elastomer (4) covering said body, said elastomeric layer being partially discontinuous over at least one front zone (5) and at least one intermediate zone (6) comprised by the body (3) of plastic material to which the shank (2) of the cutting blade (1) is attached such that the body (3) is left exposed at the discontinuous zones (5) and (6), said zones being spaced apart from each other, the level of the body at said discontinuous zone and the level of the body covered by said elastomer layer being equal such that said exposed zones are flush with said elastomer layer.

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**4,712,305**

## FREEBOARD MEASURING DEVICE

**Phillip A. Latham, P.O. Box 73600, Metairie, La. 70033**

**Filed Apr. 10, 1986, Ser. No. 850,025**
**Int. Cl.⁴ G01B *3/02***
**U.S. Cl. 33—126.5** **19 Claims**

1. A device for measuring the freeboard of a barge or structure on a body of water, comprising:

a vertical pipe;

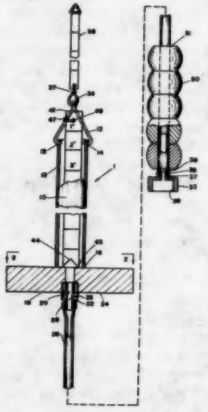
a horizontal bar with an aperture therethrough, said bar connected to said pipe in substantially perpendicular relationship;

a means for water ingress securedly, removably attached to said horizontal bar opposite said vertical pipe;

a means for reading freeboard measurement mounted, at least in part, within said vertical pipe;

a means for lowering said device into said water attached to said vertical pipe opposite said horizontal bar;

a means for stabilizing said device in said water, mounted on the means for water ingress; and



a means for preventing surging of water inside the apparatus associated with said means for water ingress.

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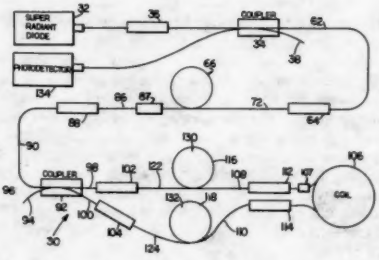
**4,712,306**

## FIBER OPTIC EARTH ROTATION GYRO COMPASS

**Richard F. Cahill, El Toro; Jeffrey A. Eck, Yorba Linda; Gerald L. Schwantz, Stanton; John P. Theriault, Fountain Valley; Philip A. Turek, Huntington Beach; Eric Udd, Huntington Beach; Raymond E. Wagoner, Huntington Beach, and Keith H. Wanser, Huntington Beach, all of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.**

**Filed Dec. 27, 1985, Ser. No. 813,721**
**Int. Cl.⁴ G01C *19/64***
**U.S. Cl. 33—304** **24 Claims**




1. A fiber optic gyro, comprising:

(a) a light source means for producing a first beam of light;

(b) a first beam splitting means for receiving the first beam of light having a photodetector means connected to one output for monitoring the light source output and a polarizing means connected to the other output for polarizing the first light beam;

(c) a second beam splitting means connected to the polarizing means for splitting the first beam of light into second and third beams of light and recombining the second and third beams into a fourth beam of light;

(d) a first phase modulator connected to the second beam splitting means for supplying a harmonic modulation to the second beam of light;

(e) a second phase modulator symmetrically connected to the second beam splitting means with respect to the first phase modulator for supplying a harmonic modulation to

the third beam of light 180 degrees out of phase with the harmonic modulation of the first phase modulator to offset environmental effects;

(f) an optical fiber loop connected to the first and second phase modulators for directing the second and third beams of light in opposite directions along a path about a predetermined axis about which rotation is be measured in a counterpropagating light path for the second and third light beams;

(g) a sensing optical fiber wound in a coil about a predetermined axis for establishing the counterpropagating light path about which rotation is to be measured, the optical fiber having first and second ends, and coupling means for applying the second and third beams of light to the first and second fiber ends respectively; and

(h) a detection means including electrical circuitry means connected to the first beam splitting means for detecting rotation of the fourth light beam recombined at the output of the optical fiber loop.

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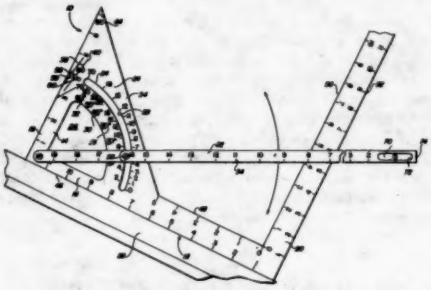
**4,712,307**

## RAFTER ANGLE MEASURING DEVICE

**Karl E. Kish, 17611 Hamlin St., Van Nuys, Calif. 91406**

**Filed Mar. 27, 1987, Ser. No. 30,558**
**Int. Cl.[4] B43L** *7/06, 13/00*
**U.S. Cl. 33—421** **9 Claims**



1. An improved rafter angle measuring device, said device comprising, in combination:

(a) a body comprising a generally U-shaped plate having a horizontal base, to opposite ends of which are connected vertical extending spaced, parallel first and second arms, said first arm including a generally sloping support portion extending from the upper portion of said first arm to about the middle portion of the length of said base; and,

(b) a third arm pivotally connected at one end thereof to said plate at about the intersection of said first arm and said base, the opposite end of which extends beyond said second arm, said third arm bearing a level and means releasably securing said third arm at a desired angle to said plate, said third arm being pivotable between a vertical position abutting said first arm and an about horizontal position adjacent said base.

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**4,712,308**

## MEASUREMENT METHOD AND APPARATUS

**Carleton R. Richmond, Jr., P.O. Box 420, North Scituate, Mass. 02060**

**Filed Aug. 29, 1986, Ser. No. 901,557**
**Int. Cl.[4] B43L** *7/06*
**U.S. Cl. 33—472** **5 Claims**

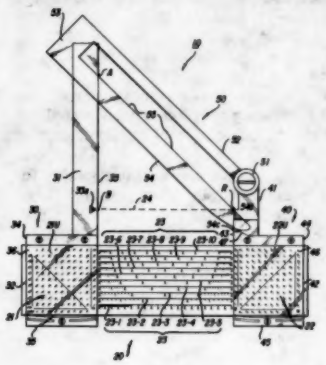
1. A contour plotter, comprising

a scale bar having at least one scale thereon;

a first slide movable in relation to said scale bar; and

a second slide movable in relation to said scale bar;

said first slide having an arm with a reference edge; and



said second slide having a pivoted coordinator arm with a movable edge;

wherein said coordinator arm doubles back as a return leg.

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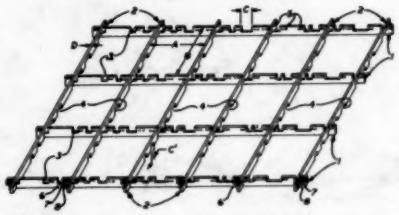
**4,712,309**

## ADJUSTABLE TEMPLATE FOR POSITIONING TILE OF VARIOUS SIZES

**Arthur G. Kingston, 3226 Orchard Dr., Palm Harbor, Fla. 33563, and Carl R. DeLong, 1605 44th Ave. South, New Port Richey, Fla. 33552**

**Filed Apr. 16, 1987, Ser. No. 38,929**
**Int. Cl.[4] G01B** *5/16*
**U.S. Cl. 33—527** **20 Claims**



1. An adjustable template designed for the positioning of tile comprising (a) a first series of parallel bars spaced from each other, each bar having similar dimensions respectively in length, width and depth and having a plurality of grooves cut therein facing downward or upward and having a width for each groove determined by the amount of adjustment required; (b) a second series of parallel bars spaced from each other and perpendicularly to the bars in said first series, each bar in said second series having similar dimensions respectively in length, width and depth and having a plurality of grooves cut therein facing upward or downward and complementary to the grooves in said first series of bars, the combined depth of a groove in the first series with a complementary groove in the second series being equal to the depth of the bars having the greater depth; and (c) a fastening means for securing approximately the end of each bar of each series to a bar in the other series; the grooves in the respective bars being of appropriate depth to have the respective bottoms of the bars in both series all in the same plane.

4,712,310

## CO-SPRAY TECHNIQUE

Suva B. Roy, Bear, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 15, 1986, Ser. No. 907,218
Int. Cl.[4] F26B *5/06*
U.S. Cl. 34—5 4 Claims

1. A process for preparing a free flowing dry powder blend suitable for preparing tablets containing ingredients which are incompatible in a single aqueous solution comprising the steps of:

(A) preparing at least two solutions suitable for use in S-1 spray-freeze processes, wherein each solution comprises ingredients compatible with one another, and wherein at least one ingredient is incompatible with at least one ingredient of another solution;

(B) spraying said solutions through separate spray nozzles onto the surface of a moving bath of boiling fluorocarbon refrigerant having a temperature below about −20° C. in such a way as to form hybrid droplets and immediately freezing said hybrid droplets;

(C) collecting the hybrid droplets; and

(D) lyophilizing said droplets.

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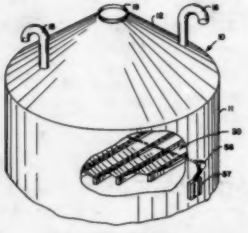
4,712,311

## GRAIN DRYING APPARATUS FOR STORAGE BIN

Ralph D. Peifer, R.R. 2, Box 155-A, Nokomis, Ill. 62075

Filed Nov. 13, 1986, Ser. No. 930,107
Int. Cl.[4] F26B *25/10*
U.S. Cl. 34—56 9 Claims



1. An apparatus for drying grain in a grain storage bin of the type wherein grain is poured in the top of the bin, said apparatus comprising:

an elevated floor substantially horizontally disposed across said bin above and in spatial relation to a bottom of said bin, said floor including means for maintaining grain thereabove while allowing heat from below said floor to pass vertically therethrough for drying grain positioned thereabove;

at least a portion of said elevated floor being slanted between a high position thereon and a low position thereon, for moving grain above said floor to said low position, a first opening through said floor at said low position for passage of grain therethrough;

grain container means having a capacity to receive a predetermined amount of grain therein, said container means being disposed subjacent said first opening;

a second opening in communication with a bottom of said grain container means for passage of grain therethrough; and

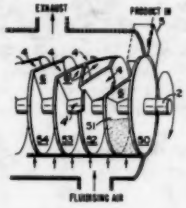
said first opening and said second opening being disposed relative said grain container means to prevent both openings from being in communication with said grain container means simultaneously.

4,712,312

## REACTION CHAMBER CONVEYOR

Spiros Christodoulou, New Barnet, United Kingdom, assignor to Din Engineering Limited, Luton, United Kingdom

Filed Jul. 15, 1986, Ser. No. 885,635
Claims priority, application United Kingdom, Jul. 15, 1985, 8517798
Int. Cl.[4] F26B *17/10*
U.S. Cl. 34—57 D 6 Claims




1. A fluidized bed reaction chamber having a perforated, part-cylindrical lower wall and a conveyor for conveying fluidized material through the reaction chamber, the conveyor comprising a shaft, a plurality of discs spaced axially along the shaft and mounted for rotation with the shaft to provide a plurality of substantially separate zones between the discs, a first opening having a leading edge and a trailing edge and defined in an upstream disc of each zone to allow for the passage of doses of fluidized material from zone to zone, and a transfer blade means associated with each opening and extending across the respective zone for urging fluidized material through the opening as the conveyor is rotated; wherein one or more of the discs is provided with a second opening disposed substantially axially opposite the opening in a preceding disc for spreading a dose of material through two or more adjacent zones for treatment during one rotation of the conveyor before being moved to the next succeeding zone.

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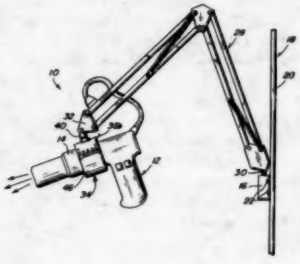
4,712,313

## HANDS FREE PORTABLE HAIR DRYER HOLDER

Carl Gettleman, 68-85 218th St., Bayside, N.Y. 11364

Filed Apr. 3, 1986, Ser. No. 847,664
Int. Cl.[4] A45B *20/14*
U.S. Cl. 34—97 5 Claims



1. A holder for a standard, separable portable hair dryer having a barrel comprising:

(a) a base member affixed to a stationary structure;

(b) a spring-tensioned extendable arm pivotally mounted at one end of said base member, said extendable arm having a terminal segment at other end; and

(c) a clamp assembly adjustably attached to terminal segment of said extendable arm, said clamp assembly adapted to removably grasp said barrel of said portable hair dryer

and to be manually turned on its axis 360 degrees allowing said hair dryer to be placed in a variety of positions in which a person using said holder is free to use their two hands for other things wherein said clamp assembly comprises:

(i) two C-shaped jaws hinged together, one of said jaws being adjustably attached to said terminal segment of said adjustable arm;

(ii) two C-shaped foam liners, each of which is affixed to an inner wall of one of said jaws for cushioning said barrel of said portable hair dryer; and

(iii) a hook and loop pile fastener strap extending between free ends of said jaws for securing said jaws in a closed position around said barrel of said portable hair dryer.

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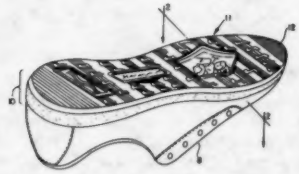
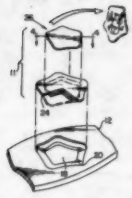
**4,712,314**

## FOOTWEAR SOLE CONSTRUCTION

**Jerome A. Sigoloff, Chesterfield, Mo., assignor to Sidney Rich Associates, Inc., St. Louis, Mo.**

**Filed Jul. 8, 1986, Ser. No. 883,049**
**Int. Cl.[4] A43B *3/30***
**U.S. Cl. 36—112** **7 Claims**





3. A footwear sole, comprising:

at least one inner ply and an outer ply, superimposed one upon the other;

said outer ply having at least one aperture formed therein and having a peripheral recess about said aperture in a surface thereof adjacent said inner ply;

and a lenticular assembly having a figure formed therein and having a peripheral flange for seating said lenticular assembly within said peripheral recess, such that an upper surface of said lenticular assembly is substantially coplanar with said surface of said outer ply adjacent said inner ply and a lower surface of said lenticular assembly is recessed relative to an outer sole surface of said outer ply.

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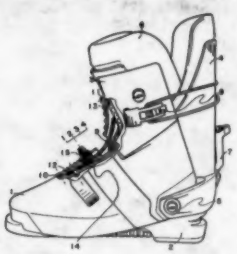
**4,712,315**

## SKI BOOT

**Joseph Morell, Annecy, and Roland Petrini, Chambery, both of France, assignors to Salomon S. A., Annecy Cedex, France**

**Filed Aug. 19, 1985, Ser. No. 767,310**
**Claims priority, application France, Aug. 17, 1984, 84 13152**
**Int. Cl.[4] A43B *5/04***
**U.S. Cl. 36—117** **27 Claims**

1. Device continuously for controlling the flexion stiffness of a ski boot comprising a shell base (1) carrying an upper composed of a flexion element (9) located in the longitudinal direction between the shell base (1) and a cuff (3) fixedly attached at only one end (10) on one of said shell base (1) and cuff (3) and whose other end cooperates in freely sliding contact with a



cam ramp or track (11) carried by the cuff (3) or the shell base (1), respectively.

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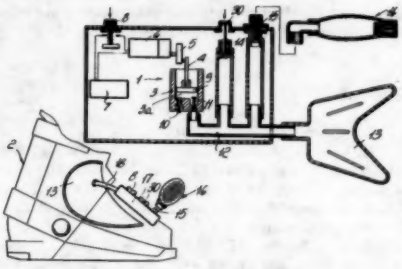
**4,712,316**

## SKI BOOT WITH A DEVICE FOR SECURING THE FOOT OF THE SKIER

**Giorgio Baggio, San Martino di Lupari, Italy, assignor to Nordica S.p.A., Montebelluna Tv, Italy**

**Filed Aug. 21, 1986, Ser. No. 898,564**
**Claims priority, application Italy, Sep. 9, 1985, 22087 A/85**
**Int. Cl.[4] A43B *5/04, 7/14***
**U.S. Cl. 36—119** **20 Claims**



1. In a ski boot having a boot structure with internal surface defining internally a wearer's foot location and including a shell structure with a heel portion, an instep portion and a sole portion and an upper structure with a front portion and a rear portion, in combination,

an electropneumatic device for securing the foot of the skier within the ski boot, comprising

inflatable means in the reach of said wearer's foot location within said ski boot and

electrically actuated fluid pressure supplying means including,

a compressor unit comprised of an electric motor, pumping means and mechanical transmission means for actuating said pumping means by said electric motor through said transmission means,

electrical energy storage means located in said boot structure and spaced from said compressor unit, circuit means with conductor means for connecting said electric motor with said electric energy storage means and duct means connecting said inflatable means with said pumping means

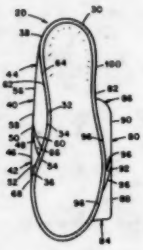
and wherein said boot structure further defines a chamber for containing therein at least said said compressor unit and having therein a sealing bag means enclosing at least said compressor unit and having stopper means with openings for the passage therethrough of said duct means and said conductor means.

4,712,317

## ATHLETIC SHOE

Gene H. Sowell, 528 Devon St., Seymour, Tenn. 37865

Filed Sep. 22, 1986, Ser. No. 910,075
Int. Cl.[4] A43B 5/02, 5/00
U.S. Cl. 36—133 7 Claims



1. In an athletic shoe for use in kicking a ball and having an upper attached to a sole, generally curvilinear heel and toe end portions at opposite longitudinal ends of the shoe, a recessed medial portion on one side of the shoe and a lateral portion on the other side of the shoe, both the medial portion and the lateral portion being defined by curved surfaces and located generally intermediate the heel and toe end portions, the improvement comprising means defining a planar ball-impacting surface on the shoe generally vertically disposed on the surfaces of at least one of said medial and lateral portions and configured to maintain said ball-impacting surface in a substantially planar configuration during flexing of the shoe.

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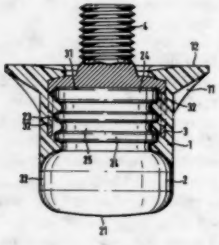
4,712,318

## GRIPPING ELEMENT FOR A SPORTS SHOE

Peter Greiner, Wangen; Hubert Pflüger, Wetzisreute, and Horst Widmann, Schwaig, all of Fed. Rep. of Germany, assignors to Adidas Sportschuhfabriken Adi Dassler Stiftung & Co. KG, Fed. Rep. of Germany

Filed Jan. 27, 1987, Ser. No. 7,177
Claims priority, application Fed. Rep. of Germany, Feb. 1, 1986, 3603127
Int. Cl.[4] A43C 13/04, 15/00
U.S. Cl. 36—134 14 Claims



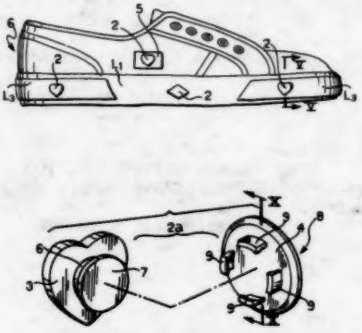
1. A gripping element for a sports shoe comprising a body portion of plastic material, a ceramic insert embedded into the body portion to form the ground-engaging surface of the gripping element, and a metal sleeve means extending around said insert within said body portion over a part of the length of said insert, said insert being provided at least on its outside surface around which said metal sleeve extends with engagement means adapted to provide for positive engagement between said insert and the plastic material of said body portion.

4,712,319

## FOOTWEAR WITH DETACHABLE VISIBILITY AIDS

Luigi Goria, Via Montosolo 8, 10025 Pino Torinese (Torino), Italy

Filed Jul. 3, 1986, Ser. No. 881,982
Claims priority, application Italy, Jul. 5, 1985, 53571/85[U]
Int. Cl.[4] A43B 23/00; G02B 5/12
U.S. Cl. 36—137 1 Claim



1. In footwear of the type having an elastomeric sole portion and an upper portion secured together and means for increasing the visibility of the footwear secured thereto, the improvement comprising a first member adapted to be secured to said footwear, a second manner including said means for increasing the visibility of the footwear, fastener means detachably connecting said first and second members and securing means for securing said first member to said footwear, wherein said fastener means is comprised of a plurality of appendages integral with one of said members and extending outwardly therefrom in a circle with each appendage having a toothed edge facing radially inwardly of said circle and a circular disk secured in spaced relation to the other of said members and adapted to be snapped into and out of engagement with said toothed edges.

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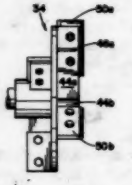
4,712,320

## FOUR-WAY REVERSIBLE DITCHER BLADES

Jack O. Cartner, 1005 N. 8th St., Cambridge, Ohio 43725

Division of Ser. No. 600,507, Apr. 16, 1984, Pat. No. 4,612,715, which is a continuation of Ser. No. 416,642, Sep. 10, 1982, abandoned. This application Apr. 21, 1986, Ser. No. 854,195
The portion of the term of this patent subsequent to Sep. 23, 2003, has been disclaimed.
Int. Cl.[4] E02F 5/08
U.S. Cl. 37—92 5 Claims



5. A four-way reversible ditching blade for a ditching apparatus which includes a prime mover, an arm assembly operatively connected at a first end with the prime mover, a ditcher head operatively connected with a second end of the arm assembly, the ditcher head including a support member mounted for rotation about a central axis, a motor means for

rotating the support member, and a plurality of blade mounting brackets which have blade mounting faces disposed perpendicular to the rotary support member and extending radially from the central axis, the blade mounting brackets include a plurality of mounting apertures extending therethrough, the ditching blade being a generally planar rectangle which is symmetric about each of three axes to be four-way reversible for fastening to one of the blade mounting brackets in any one of four orientations to quadruple blade life, the ditching blade comprising:

(1) first and second generally planar faces disposed symmetrically relative to a face plane extending centrally therebetween;

(2) the first and second faces terminating at oppositely disposed first and second ends, the first and second ends being symmetric about an end axis which extends centrally therebetween;

(3) the first and second faces further terminating at oppositely disposed first and second edges, the first and second edges being symmetric about an edge axis extending centrally therebetween and perpendicular to the end axis;

(4) the first and second edges, faces, and ends defining four cutting areas:

(a) a first cutting area disposed along contiguous portions of the first edge, the first face, and the first end;

(b) a second cutting area disposed along contiguous portions of the first edge, the second face, and second end;

(c) a third cutting area disposed along contiguous portions of the second edge, the first face, and second end; and,

(d) a fourth cutting area disposed along contiguous portions of the second edge, the second face, and first end;

(5) a plurality of mounting apertures extending between the first and second faces and disposed symmetric with respect to both the end and edge axes, the blade mounting apertures being disposed such that the blade is mountable through the mounting bracket apertures:

(a) with the second edge along the rotatably mounted support member and the first and extending generally radially beyond the rotary support member such that the first cutting area is disposed radially and axially outermost;

(b) with the second edge disposed along the rotatably mounted support member and the second end extending radially beyond the radial support member such that the second cutting area is disposed radially and axially outermost;

(c) with the first edge along the rotatably mounted support member and the second end extending generally radially beyond the radial support member such that the third cutting area is disposed radially and axially outermost; and,

(d) with the first edge disposed along the rotatably mounted support member and the first end extending radially beyond the radial support member such that the fourth cutting area is disposed radially and axially outermost;

whereby the blade is selectively mountable in four positions to quadruple blade life.

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**4,712,321**

## EXCAVATOR TOOTH FOR EARTH MOVING EQUIPMENT

**Rütger Berchem, Gelsenkirchen, and Georg Prokscha, Recklinghausen, both of Fed. Rep. of Germany, assignors to Berchem & Schaberg GmbH, Gelsenkirchen, Fed. Rep. of Germany**

**Filed Oct. 29, 1986, Ser. No. 924,617**

**Claims priority, application Fed. Rep. of Germany, Oct. 29, 1985, 3538355**

**Int. Cl.⁴ E02F 9/28**

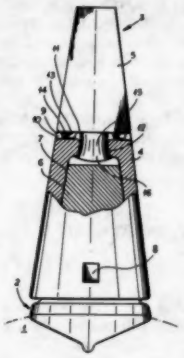
**U.S. Cl. 37—142 R** **1 Claim**

1. A tool for loosening and loading for a dredger, a suction strainer dredger, a wheel loader, a shovel loader or the like comprising:

an adapter attached at an end thereof to a tool support;

a tooth attachable to said adapter, said tooth comprising a bottom portion and a tooth peak formed as independent components of said tool, said tooth peak having a supporting face which engages on a complementary supporting surface of said bottom portion, said bottom portion having a hole therein leading to an interior area;

a mounting pin which is guided through said hole, said hole being surrounded by said supporting surface of said bottom portion, said pin being deformed into a rivet attaching said tooth peak and said bottom portion, said hole having a conical widening directed interiorly and said rivet formfitting said conical widening; and



a plurality of complementary rotation-preventing locking elements provided on said supporting surface and said supporting face.

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**4,712,322**

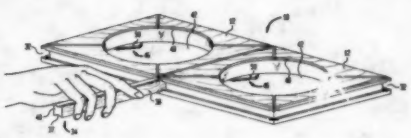
## MULTIPLE MODULAR FRAME APPARATUS FOR DISPLAYING ITEMS

**Gene L. Rubin, Mercer County, N.J., assignor to Liberty Gifts, Inc., Trenton, N.J.**

**Filed Jul. 21, 1986, Ser. No. 887,814**

**Int. Cl.⁴ G09F 1/12**

**U.S. Cl. 40—156** **6 Claims**



1. A multiple modular frame apparatus comprising:

a. a plurality of multi-sided rhombus shaped frames for displaying items, wherein one interior angle of each of said frames is less than 90 degrees, said angle being the same as the corresponding interior angle of every one of said frames, and each peripheral side of each of said frames has the same lengthwise dimension;

b. groove means extending lenthwise fully across the peripheral sides of said frames, wherein said groove means is a dove-tail groove;

c. engagement means for engaging the groove means of said frames, wherein said engagement means includes a first and second projection means for engaging at least two of said frames by said groove means, said first and second projection are disposed 180 degrees apart as viewed endwise towards said engagement means, said projection means extending axialy along the entire edge of said engagement means, the axial length of said engagement means is not greater than the lengthwise dimension of said

peripheral sides minus the width, as viewed endwise, of the engagement means, whereby the engagement means is complimentary to any two of said frames for slidably engaging said grove means of said frames so that said engagement means can be inserted into any of said grove means so that said frames can completely surround the middle frame;

d. a circular aperture in at least one of said frames for viewing a displayed item, wherein at least one of said frames does not include said circular aperture; and,

e. a retaining means for retaining said items in said aperture of said frames, wherein said retaining means includes,

(i) a projection on the interior of said circular aperture; and,

(ii) a resilient clip attached to the back of said frame for holding said display item against the projection securely in said frame.

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**4,712,323**

**MULTIPLE BARREL RIFLE AND TRIGGER MECHANISM**

**Vittorino Masina, Via Novelli 732, S. Pietro in Casale (Bologna), Italy**

**Filed Aug. 14, 1986, Ser. No. 896,949**

**Claims priority, application Italy, Aug. 27, 1985, 3523 A/85**

**Int. Cl.[4] F41C** *7/00, 11/10, 19/00*

**U.S. Cl. 42—42.01** **4 Claims**

1. A hunting rifle, comprising:

a barrel assembly comprising three mutually adjoining barrels having axes located at respective vertices of an equilateral triangle having a downwardly pointing vertex and including a lower centrally positioned barrel and a pair of laterally adjacent upper barrels, all of said barrels having the same bores but being formed with chokes set for different firing spreads;

a breech assembly swingably connected to said barrel assembly and comprising:

a breech closure forming a housing,

a pair of outer hammers respectively juxtaposed with firing pins aligned with said upper barrels and swingably mounted in said housing,

a central hammer disposed between said outer hammer, juxtaposed with a firing pin aligned with said lower barrel, and swingably mounted in said housing,

respective coil hammer springs bearing upon said hammers and biasing same in the direction of the respective hammers,

respective retaining levers pivotally mounted on said housing and engageable with said hammers for retaining the respective hammers in cocked positions,

a trigger mounted in said housing,

a rocker arm pivotally connected to said trigger in said housing and provided with a raising tooth positioned for successive engagement with said levers in a predetermined firing sequence for said hammers and said barrels whereby as said raising tooth successively engages said levers, said levers release the respective hammers,

respective lever springs bearing upon said levers and swinging same out of the path of said tooth upon the release of the respective hammer by the respective lever whereby a subsequent pull on the trigger will permit said tooth to engage only the next lever to be released from the respective hammer in said sequence,

a cock rod displaceable in said housing by the swinging of said breech assembly relative to said barrel assembly to close the breech of the rifle, and

a cock lever in said housing displaceable by said cock rod and acting upon all of said hammers to compress said hammer springs and cock said hammers simultaneously; and

a stock connected to said breech assembly.

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**4,712,324**

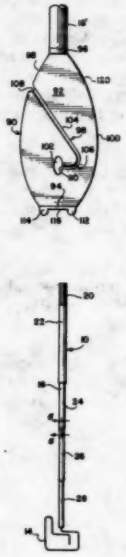
**FISHHOOK AND LURE RETRIEVING DEVICE**

**Bobby R. Padgett, Rte. 5 - Box 684, Chipley, Fla. 32428**

**Filed Aug. 4, 1986, Ser. No. 892,852**

**Int. Cl.[4] A01K** *97/00*

**U.S. Cl. 43—17.2** **16 Claims**



1. A device for engaging and manipulating a snagged fish line comprising:

a pole having first and second ends; and

a tip attached to said first end, said tip comprising a substantially continuous outer surface of a solid member,

an interior line engaging area inward of said outer surface, said line engaging area extending through said tip,

a barrier separating said outer surface and said line engaging area, and

a passageway from said outer surface to said line engaging area,

said interior line engaging area comprising an eye in said

tip, the axis of said eye being perpendicular to the longitudinal axis of said pole,

said passageway is hook shaped, having a straight portion and a curved portion, each of said straight and curved portions having first and second ends,

said first end of said straight portion opening to the exterior of said tip and said second end of said straight portion interfacing with said first end of said curved portion, said second end of said curved portion opening into said line engaging area.

13. A device for engaging and manipulating a snagged fish line comprising:

a pole having first and second ends; and

a tip attached to said first end, said tip comprising a curved wire lying in a plane substantially parallel to the longitudinal axis of said pole, having an outer surface and including, in sequence

a first portion perpendicular to the longitudinal axis of said pole, a second portion parallel to the longitudinal axis of said pole and extending away from said pole, a third portion perpendicular to the longitudinal axis of the pole and extending past the longitudinal axis of said pole, a fourth portion parallel to the longitudinal axis of said pole and extending back towards said pole, a fifth portion perpendicular to the longitudinal axis of said pole and extending towards said pole, a sixth portion parallel to said longitudinal axis of said pole in parallel overlapping relationship with said fourth portion, a seventh portion extending perpendicular to said longitudinal axis of said pole, and an eighth portion extending parallel to said longitudinal axis of said pole in overlapping relationship with said second portion.

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**4,712,325**

## FISHING LURE

**Charles E. Smith, 2321 Grange Hall Rd., Dayton, Ohio 45431**

**Filed Mar. 21, 1986, Ser. No. 842,327**

**Int. Cl.[4] A01K** *85/00*

**U.S. Cl. 43—42.24** **6 Claims**

1. A fishing lure comprising:

a body having a weighted head portion with means for attaching fishing line thereto and a hook portion having a shank extending rearwardly therefrom; and

a plurality of relatively thin, elongate strips of chamois attached to said shank rearwardly of said head portion, said strips being of varying lengths, thereby imparting a shaggy appearance to said lure, and being attached to said shank completely about a periphery thereof such that said strips radiate radially outwardly from said shank about an entire periphery thereof when said lure is immersed in water, said strips each having a free end trailing behind said head portion.

**4,712,326**

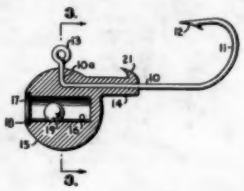
## NOISEMAKING FISHING LURE

**Gary W. Hoover, Rte. 1, Box 47, Pleasant Hill, Mo. 64080; Geuane Empson, 9216 Stubbs Rd., Kansas City, Mo. 64138, and Bruce W. Ashley, 5007 Manchester, Kansas City, Mo. 64129**

**Filed Jul. 14, 1986, Ser. No. 885,464**

**Int. Cl.[4] A01K** *85/00*

**U.S. Cl. 43—42.31** **3 Claims**




1. A weighted, noisemaking hook and body assembly for use as a jig type fishing lure comprising, in combination:

a hook having an elongate, largely substantially straight shank, an eye at end of the shank and a bend portion and a terminal barbed point both positioned at the other end of the shank,

a lead weight cast in the greater length portion thereof on the substantially straight shank portion and also along at least a portion of the eye end of the shank portion adjacent to the eye,

said weight having essentially two portions thereof:

a first weight portion being positioned relatively far from said eye end of the hook shank and comprising a substantially cylindrical sleeve embracing part of said hook shank portion away from said eye,

and a second weight body portion positioned relatively adjacent to said eye and fartherest from the bend and barbed point of the hook, such second weight body portion being an enlarged, thickened body portion of considerably greater thickness than said hook shank and sleeve,

the said thickened body portion being positioned on the outside surface of the hook shank away from the side thereof leading into the closed end of the hook bend and also leading into the interior side of the barbed hook point,

a cavity formed in one end of said second weight body portion, said cavity having a first, straightly extending, cylindrical, deeper inward portion of relatively lesser uniform internal diameter and a shallower outermost second portion of greater internal diameter symmetrically encircling the outer end of said first inward cavity portion, whereby to form a circumferential shelf therebetween,

the elongate extension of said first portion of said cavity being positioned substantially parallel to the hook shank portion next thereto and extending a substantial portion of the length of said second weight body portion,

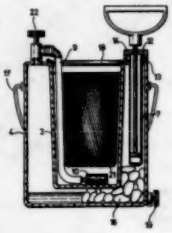
one spherical pellet positioned in said first cavity portion, said pellet being of lesser outer diameter than the internal diameter of said first cavity portion and operative to move and roll to and fro wherewithin as the orientation of the first cavity portion varies as the fisherman works the jig type fishing lure, thereby successively to impact on the inside surfaces of the inner and outer end closures of the said cavity,

said cavity open and closed by a metallic cap placed on said cavity shelf with the material of the second portion of said cavity positioned around and outside of said shelf circumferentially formed downwardly on the peripheral outer edge of said cap, whereby to retain the cap on the said shelf in first cavity portion sealing fashion.

## 4,712,327
## AERATED LIVE WELL

Ron S. Ross, Sr., P.O. Box 304, (Rte. 5), and Claude W. Goff, Sr., P.O. Box 292, (Rte. 5), both of Manning, S.C. 29102

Filed Feb. 5, 1987, Ser. No. 11,324
Int. Cl.[4] A01K 97/04
U.S. Cl. 43—57 6 Claims



1. An aerated live well comprised of a moulded, thermoplastic, double walled container;

which is formed by joining and sealing a flanged lip of an inner wall container with a flanged lip of an outer wall container

said inner wall container being substantially bucketshaped having a curved or parabolic bottom, straight vertical or slanted sides and a flanged upper lip which flares outward, a portion of the lip arching upward forming a semi-circular threaded stem, said outer wall container being substantially cylindrical in shape having a flat enclosed bottom, vertical sides and an inward flanged upper lip, a portion of the lip arching upward forming the balance of the semicircular threaded stem,

a hand pump which screws onto the said threaded stem, the bulk of the pump projecting downward through the orifice of the stem into the inner wall chamber, said hand pump forcing pressurized air into the inner wall chamber and can on occasion be removed temporarily to add ice through the stem orifice to the inner wall chamber;

a pin point hole nipple which penetrates into the inner wall chamber and is affixed to the upper third of the double walled container, through which air flows;

and a section of tubing that is connected to the said nipple on one end and an air diffusion stone on the other, said stone resting on or near the bottom of the well;

which when filled with water and pumped up with air will provide a hospitable environment for bait for a number of hours.

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## 4,712,328
## TREE STAND HAVING A CASTING WITH CLAMPING DEVICES FOR HOLDING A TREE TRUNK

Jakob Gies, Solmser Strasse 14, D-6434 Niederaula I, Fed. Rep. of Germany

Filed Mar. 2, 1987, Ser. No. 20,519
Claims priority, application Fed. Rep. of Germany, Mar. 1, 1986, 3606778
Int. Cl.[4] A01G 17/06
U.S. Cl. 47—40.5 12 Claims

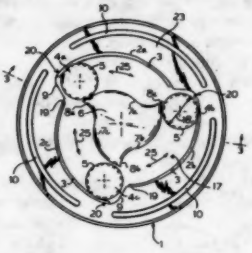
1. A tree stand for holding and supporting a tree having a trunk comprising:

a casing having an inner wall with spirally curved surfaces;

a guide piece disposed in the center of said casing, said guide piece having guide curves each with a curvature corresponding with the curvature of said spirally-curved surfaces of the inner wall of said casing;

clamping cylinders disposed inside said casing between said guide piece and said spirally-curved surfaces of said casing inner wall; and

means for moving said clamping cylinders within the spirally-curved surfaces of said guide piece and said inner wall



of said casing so that said cylinders spirally close upon the trunk of the tree.

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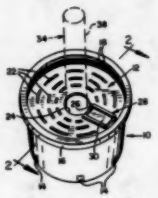
## 4,712,329
## LIDDED NURSERY PLANT CONTAINER

George C. Anderson, 2425 SE. Moores St., Portland, Oreg. 97222, and Richard J. Paul, 8655 SE. Revenue Rd., Boring, Oreg. 97009

Filed Jan. 22, 1986, Ser. No. 821,465
Int. Cl.[4] A01G 9/02
U.S. Cl. 47—84 2 Claims



1. A lidded nursery plant container of the class in which large plants may be grown, stored, tranported and merchandised without removal from the container, comprising in combination:

(a) a container for the root structure and growing medium of a plant, the container having an open top,

(b) a plurality of substantially continuous, vertically-spaced, circumferentially-extending, friction ribs on the inner surface of the container, adjacent the open top thereof,

(c) a lid comprising a substantially continuous sheet of substantially planar, substantially liquid-impervious, flexible plastic material capable of being pushed downwardly across the ribs to a position below one of the ribs, for closing the open top of the container and packing the growing medium of the plant into the container,

(d) the lid having a plurality of radially spaced, concentrically arranged stiffening ribs,

(e) the lid also having a central opening for receiving the stem of a plant, and a fixed radial slot extending from the central opening to the outer margin of the lid for passing the plant stem therethrough,

(f) a slide block closure having grooves slidably to engage the margins of the radial slot for closing the slot, and

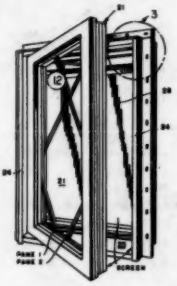
(g) the container further characterized by the presence of an open top defined by a reversely bent, integral, stiffening flange spaced from the container side wall, which facilitates manual handling of the heavy, filled container.

4,712,330

## WEATHERSTRIPPING FOR SIDE-HINGED WINDOWS AND DOORS

James R. Beirnes, P.O. Box 2099, Joliet, Ill. 60434

Filed Jul. 30, 1986, Ser. No. 890,506
Int. Cl.[4] E06B 7/16
U.S. Cl. 49—484 1 Claim



1. The combination comprising, a planar window or door, a planar frame for said window or door, said window or door being hinged at one side to said frame so that the window or door swings outwardly and inwardly in relation to the frame, the top of said window or door being spaced slightly beneath the adjacent portion of said frame to permit relative swinging movement between window and frame, a continuous row of resilient fibers mounted on said frame adjacent the top of said window or door and the adjacent portion of the frame of the window or door and the adjacent portion of the frame when the window is closed, said resilient row of fibers extending downwardly for said frame a distance greater than said space between the top of the window and the frame, said resilient row of fibers being horizontally spaced outwardly from said window when closed a distance about equal to or greater than the distance that said row of fibers extend downwardly form said frame, and said row of resilient fibers extending across the width of said window or door whereby as the window or door swings to open or closed positions the row of fibers deforms incrementally along the moving juncture between the top of the window or door and the frame to thereby provide a continuous seal against rainwater and wind leakage between the window or door top and the frame.

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4,712,331

## DOOR

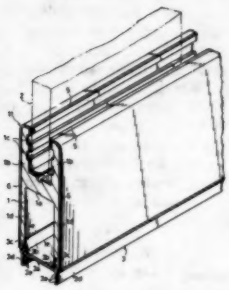
Kenichi Fujiwara, Itami, Japan, assignor to Hardglass Industry Co., Ltd., Hyogo, Japan

Continuation of Ser. No. 812,978, Dec. 24, 1985, abandoned. This application May 27, 1987, Ser. No. 56,349
Claims priority, application Japan, Dec. 26, 1984, 59-197161[U]
Int. Cl.[4] E05B 7/16
U.S. Cl. 49—488 3 Claims

1. A door comprising:

a door main body (11) including a pair of longitudinally extending side plates (1*d*) which outwardly protrude in parallel spaced relation with respect to each other from at least one side edge of said door, each of said side plates having an engaging groove (1*e*) on its inner side surface, the engaging grooves extending in the longitudinal direction along the length of said side plates; and

an air shielding member (3) attached to said side plates of said door main body, said air shielding member comprising a resiliently deformable flat plate portion (3*a*) made of a rigid synthetic resin and extending in the longitudinal direction along each of the protruding surfaces of said side plates, a pair of attaching plates (3*b*) disposed between said side plates and protruding inwardly in parallel spaced relation with respect to each other from respective longitudinally extending side edges of said flat plate portion with the outside surfaces of said attaching plates maintained in close contact with respective inside surfaces of said side plates, each of said attaching plates having a holding protrusion (3*c*) extending in the longitudinal direction along the length of said attaching plates for locking engagement with a respective one of said engaging grooves of said side plates, and a pair of shielding plates (3*d*) made of a soft synthetic resin and protruding outwardly in parallel spaced relation with respect to each other from respective longitudinally extending side edges of said flat plate portion,



said air shielding member adapted to be directly fitted into shielding engagement with said door main body by positioning said longitudinally extending holding protrusions (3*c*) against the longitudinally extending side plates (1*d*) and pushing the shielding member inwardly while resiliently deforming said flat plate portion (3*a*) and said attaching plates (3*b*) until both the protrusions (3*c*) are lockingly engaged with respective ones of said engaging grooves (1*e*).

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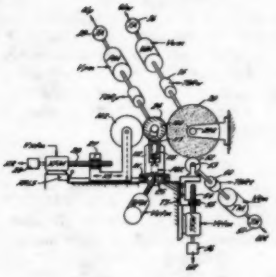
4,712,332

## CENTERLESS AND CENTER-TYPE GRINDING SYSTEM

Roderick L. Smith, Rockford, Ill., assignor to Energy Adaptive Grinding, Inc., Rockford, Ill.

Continuation of Ser. No. 688,904, Jan. 4, 1985, abandoned, which is a division of Ser. No. 445,689, Nov. 30, 1982, Pat. No. 4,507,896. This application Jul. 1, 1986, Ser. No. 881,478
Int. Cl.[4] B24B 5/00
U.S. Cl. 51—103 WH 16 Claims



1. A center-type grinding system comprising the combination of

a grinding wheel mounted for rotation about a fixed axis, and means for rotationally driving the grinding wheel at a controllable speed;

a non-deformable backup wheel mounted for free-wheeling

rotation about its axis and being neither rotationally driven nor rotationally braked, said backup wheel having an axial length at least as great as that of said grinding wheel;

workpiece support means for supporting a workpiece on a predetermined axis of rotation located between said grinding wheel and said backup wheel, said support means being bodily movable freely toward the grinding wheel to permit a workpiece supported thereby to be advanced into rubbing contact with the grinding wheel but said support means being free from any translation drive to produce bodily movement of the support means itself;

means for rotationally driving said workpiece around said predetermined axis at a controllable speed; and

means for bodily moving said backup wheel into idling rolling contact with said workpiece and toward the grinding wheel at a controllable rate so that the feeding movement of the workpiece toward the fixed-axis grinding wheel is effected solely by the controlled bodily movement of the backup wheel, whereby free-wheeling the backup wheel in rolling contact with the workpiece provides firm support for the workpiece against the grinding forces reactively applied from the wheel thereto.

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**4,712,333**

## TUMBLING MEDIA

**Hugh P. Lofton, Long Beach, Calif., assignor to Huck Manufacturing Company, Southfield, Mich.**

**Filed Jan. 23, 1986, Ser. No. 821,724**
**Int. Cl.[4] B24B *31/14***
**U.S. Cl. 51—164.5** **11 Claims**

1. A tumbling media element for polishing or abrading workpieces, comprising:

a non-magnetic, abrasive body member molded of a first material having a predetermined density;

an insert member molded within a matrix of said body member and formed of a second material having a density greater than said predetermined density of said body member for increasing the mass of said element; and

a positioning and aligning member formed of a plastic material, said positioning and aligning member being permanently molded within said body member and molded around said insert member, said positioning and aligning member having a mold engaging portion for aligning said insert member within said body member during molding of said body member.

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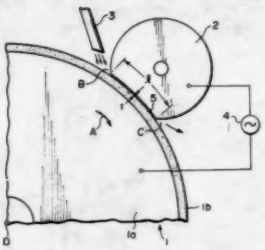
**4,712,334**

## ANTI-CLOGGING DEVICE FOR GRINDING WHEEL

**Yasuo Ikezaki, Kanagawa; Tadashi Matsuoka, Tokyo, and Kazuyuki Mitani, Tokyo, all of Japan, assignors to Toshiba Tungaloy Co., Ltd.; Science & Creative Co., Ltd. and Toyomitsu Kogyo, Co., Ltd., all of, Japan**

**Filed Aug. 28, 1986, Ser. No. 901,198**
**Claims priority, application Japan, Sep. 5, 1985, 60-196773**
**Int. Cl.[4] B24B *55/02***
**U.S. Cl. 51—262 A** **10 Claims**

1. An anti-clogging device for preventing a grinding surface of a grinding wheel from being clogged with cuttings, comprising: an opposed member which is opposed to the grinding surface of the grinding wheel over a predetermined length with a fine space therebetween, and an eliminating liquid feeding means which feeds cutting eliminating liquid into the fine




space between the opposed member and the grinding surface from the outside of the opposed member at the end thereof facing in the direction opposite to the direction of rotation of the grinding wheel.

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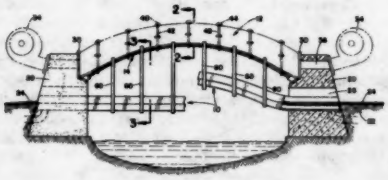
**4,712,335**

## METHOD OF SPAN CONSTRUCTION

**Howard L. Barkdull, Jr., 21 West Dr., Olmsted Township, Cuyahoga County, Ohio 44138**

**Filed Dec. 17, 1986, Ser. No. 942,777**
**Int. Cl.[4] E04B *1/345*; E04G *11/04***
**U.S. Cl. 52—2** **7 Claims**




1. A method of erecting a span between two points, comprising the steps of:

securing an elongated, flexible tubular sheath to said two points, said tubular sheath having an upper side and a lower side which has apertures of predetermined dimension and spacing disposed therealong:

inflating said sheath with a gaseous fluid to form an arched tubular span connecting said points, inflation of said sheath creating a pressure differential between the upper and lower sides thereof caused by said gaseous fluid exiting said apertures;

maintaining inflation of said tubular span to effect a constant pressure differential across said tubular sheath, said pressure differential creating an upward force gradient on said tubular span;

erecting a generally rigid frame structure supported by said tubular span said upward force gradient supporting erection of said structure;

anchoring said frame structure at said two points;

utilizing said frame structure as support to erect a permanent load-bearing span between said two points;

permanently anchoring said span at said two points; and

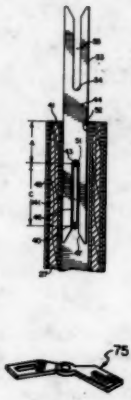
deflating and removing said sheath.

4,712,336

## INTERCONNECTING "FULL BLEED" MODULAR PANEL AND CONNECTIVE HARDWARE SYSTEM TO FORM A VARIETY OF EXHIBIT AND OFFICE INTERIOR ENCLOSURES

Bruce E. Backer, 4430 Del Monte Ave., San Diego, Calif. 92107

Continuation-in-part of Ser. No. 485,864, Apr. 18, 1983, abandoned. This application Aug. 25, 1986, Ser. No. 900,161
Int. Cl.[4] E04B *1/344*
U.S. Cl. 52—71 44 Claims






1. A modular full bleed panel and connective hardware system for which a variety of structures with shapes characteristic of wall segments, booths and the like may be rapidly assembled, said system comprising:

(a) a plurality of full bleed panels of modular dimensions which may be connected vertically and horizontally, each panel comprising:

(i) a substantially rigid internal frame fully covered on its visible surfaces, said frame having two opposite vertical edges extending from top to bottom of the panel;

(ii) channel means fully recessed in each of said two opposite vertical edges of said frame for use in interconnecting the panels, each channel means being formed with openings at either end thereof, said openings being at the top and bottom of said panel respectively, and positioned to enable longitudinal alignment of corresponding channel means of two panels aligned vertically and substantially parallel alignment of corresponding channel means of two panels aligned horizontally; and

(iii) stop means as part of each channel means, said stop means being spaced a predetermined distance from said openings at either end of said channel means; and

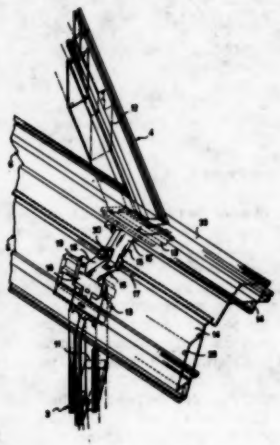
(b) a plurality of modular connector means each of which is adapted for insertion into adjacent ends of said channel means of at least two adjacent panels aligned vertically or horizontally; each connector means comprising at least two elongated, substantially rigid vertical post members and a horizontal plate member cooperating therewith, each said post member having an end adapted to extend into an open end of one of said adjacent channel means, the distance each post can extend into said end of said channel means being defined by said stop means; the other end of each said post member cooperating with said plate member, said post members extending respectively into said adjacent channels of said adjacent panels to provide positive, substantially rigid or hinged vertical or horizontal alignment of said two adjacent panels by connection only through the ends of the channels.

4,712,337

## LOAD-CARRYING STRUCTURE FOR MAKING VOLUME-ENCLOSING CONSTRUCTIONS, IN PARTICULAR FOR PLACING AGAINST BUILDINGS

Alain Marcusse, and Max Pinel, both of Toulouse, France, assignors to Technal International S.A., France

Filed Jul. 31, 1986, Ser. No. 892,353
Claims priority, application France, Aug. 8, 1985, 85 12163
Int. Cl.[4] E04B *7/02*
U.S. Cl. 52—90 13 Claims



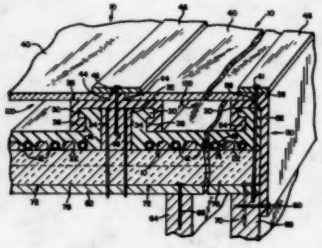
1. A load-carrying structure for making a volume-enclosing construction suitable, in particular, for being applied against a building, said volume-enclosing construction having an outside surface including two planes which intersect along a line of intersection and constitute the geometrical figure of a dihedral, at least one of said planes being defined by at least two load-carrying bars having longitudinal axes and longitudinally-extending cavities, two intersection bars each having a central web, and each of said planes having an edge along said line of intersection which edge is constituted by an associated one of said intersection bars, said load-carrying structure including the improvement of first link means for fixing each of said intersection bars to the associated one of said planes, said first link means including, at least when said associated one of said planes is defined by load-carrying bars, bar stubs which are fixed to said intersection bar by means of an intermediate bearing plate and which are inserted end wise into corresponding ones of said cavities of said load-carrying bars, and of second link means which are provided between said intersection bars, said second link means including two joining parts each fixed to said central web of a respective one of said two intersection bars, means releasably connecting said two joining parts to one another as a hinge for pivotal movement relative to one another about an axis which runs substantially parallel to said line of intersection between said two planes, but which runs at any desired angle relative to said longitudinal axes of said load-carrying bars defining said intersecting planes, and means releasably fixing said intermediate bearing plates and said two joining parts to the associated ones of said central webs of said two intersection bars so that said first and second link means are capable of being disassembled from said intersection bars and from said load-carrying bars.

**4,712,338**

## SOLAR-ENERGY-COLLECTING STRUCTURAL UNIT AND SOLAR ROOF

**Lorn L. Trickel, 8806 NE. Thompson St., Portland, Oreg. 97220**

**Filed Jun. 30, 1986, Ser. No. 879,954**
**Int. Cl.[4] E04D *1/36*; F24J *2/04***
**U.S. Cl. 52—90** **4 Claims**



1. A solar roof comprising:

a support surface,

a plurality of solar-energy-collecting units positioned on the supporting surface in spaced relation to each other, each collecting unit comprising a panel of solar-energy-absorbing material adapted to lie on the underlying supporting surface, the panel having on its undersurface a plurality of downwardly extending projections serving as feet which support the panel on the underlying supporting surface, the projections being spaced from each other by an amount predetermined to provide channels therebetween dimensioned to receive and support conduit means for transporting fluid heat exchange medium in heat exchange relation to the panel, and an elongated flexible conduit supported removably in said channels under the panel in a selected pattern and having fluid heat exchange medium inlet and outlet ends,

securing means for securing the units to the supporting surface,

a cap piece overlying the space between each adjacent pair of collecting units, and

fastening means for releasably coupling the cap piece to the adjacent pair of collecting units, the fastening means comprising interlocking flange means on the cap piece and the panels of the collecting units.

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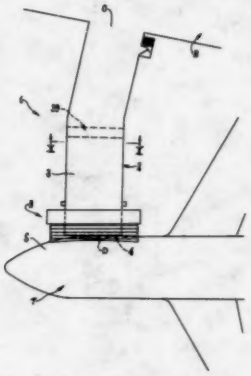
**4,712,339**

## STRUCTURES FOR ENCLOSED TRANSFER OF PERSONS

**Bruce T. Wenham; Raymond Cook, and Clifford R. Hunter, all of Victoria, Australia, assignors to Astarni Pty. Ltd., Australia**

**Filed Jun. 2, 1986, Ser. No. 869,332**
**Claims priority, application Australia, Jun. 5, 1985, PH911**
**Int. Cl.[4] E04H *14/00***
**U.S. Cl. 52—173 PS** **22 Claims**

1. Apparatus for providing a vector connection between an opening in a generally enclosed walkway and an opening in a structure located adjacent the walkway, the apparatus being mountable at the walkway opening so as to vector seal between the walkway and the apparatus, the apparatus including a tubular sealing part providing a passageway with one open end for surrounding the walkway opening and an opposite open end for surrounding the structure opening, the sealing part being composed of flexible material and having a plurality of expandable chambers arranged in side-by-side relationship, each chamber being of a generally endless encompassing configuration and extending peripherally entirely about the passageway, expansion of the chambers flexing the sealing part causing it to project at least substantially axially from the walkway and abut with a surface of the adjacent structure so that the other open end of the passageway surrounds the structure opening, contraction of the chambers allowing the sealing part to be retracted from the structure back to adjacent the walkway opening, at least one of the chambers being adjacent the opposite open end of the passageway and deforming as necessary upon abutment of the sealing part with the structure so that the sealing part conforms to the structure surface and



vector seals completely about the structure opening, a plurality of elongated stiffening ribs connected to the sealing part so as to extend peripherally thereof, and the stiffening ribs being independent of each other and supporting the sealing part against radial collapse but not inhibiting axial projection or retraction of the sealing part.

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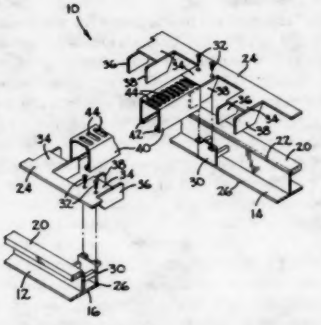
**4,712,340**

## DECKING SUPPORT MEANS

**John Sogge, Orlando, Fla., assignor to FMC Corporation, Chicago, Ill.**

**Filed Sep. 22, 1986, Ser. No. 909,796**
**Int. Cl.[4] B44D *5/08*; E04C *2/42***
**U.S. Cl. 52—177** **11 Claims**



1. A floor system having a first floor means including a pair of projection means extending outwardly and downwardly from the bottom surface of said first floor means and beyond the top surface of said first floor means;

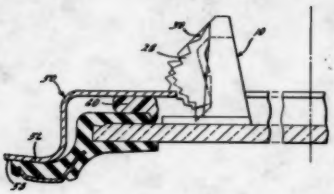
a second floor means carried on said projection means of said first floor means in a free floating engagement, said second floor means having sidewall portions extending downwardly from a top surface of said second floor means whereby said sidewalls are positioned outboard of said projection means and the bottom surface of said second floor means is in contact with said projection means.

4,712,341

## MODULAR WINDOW ASSEMBLY CLIP

Charles F. Harris, Jr., Ypsilanti, and James C. Coleman, Milford, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Aug. 14, 1986, Ser. No. 896,492
Int. Cl.[4] E06B 3/00
U.S. Cl. 52—208 16 Claims



1. An automotive window assembly of the type having a modular window assembly consisting of a pane of glass surrounded by an elastomeric molding insertable into a rabbet flanged aperture in an automobile body to be adhesively secured thereto, the modular window assembly being positioned with respect to the aperture by a plurality of clip members operatively disposed between the modular window assembly and the aperture, each clip member comprising an integrally formed resilient unitary member including:

a base portion abuttingly engaging and fixedly secured to the glass pane proximate its periphery;

a positioning leg portion extending perpendicularly from the base portion away from the glass pane; and

a locking leg portion comprising a locking leg extending at an acute angle in cantilever fashion from the positioning leg portion and having a curvilinearly extending locking surface formed at its free end for engagement with an inner peripheral surface of the body aperture upon insertion of the modular window assembly toward the aperture, the locking leg being inwardly deflectable toward the positioning leg portion during the insertion and being resiliently urged toward locking engagement with the peripheral surface.

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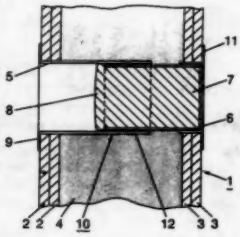
4,712,342

## FIRE-SEALED LEAD-THROUGH FOR FRAMED BUILDING COMPONENTS

Bengt E. Legerius, and Inge Sundström, both of Nyköping, Sweden, assignors to Thorsman & Co. Aktiebolag, Nykoping, Sweden

PCT No. PCT/SE85/00373, § 371 Date May 19, 1986, § 102(e) Date May 19, 1986, PCT Pub. No. WO86/02119, PCT Pub. Date Apr. 10, 1986
PCT Filed Sep. 27, 1985, Ser. No. 871,407
Claims priority, application Sweden, Sep. 28, 1984, 8404880
Int. Cl.[4] E04F 17/08; E04B 5/48; F16L 5/02; H02G 3/22
U.S. Cl. 52—221 8 Claims



1. A method of fire-sealing a lead-through for at least one cable or wire in the framework of a building comprised of two spaced walls, said method comprising

forming a hole through the framework inclusive of aligned holes in the spaced walls,

inserting through the hole in the framework a lead-through formed of an inner pipe containing an elastic, fire-resistant foam material precompressed transversely in the pipe and an outer pipe surrounding the inner pipe over a portion of the length of the inner pipe with a gap providing capability of relative axial displacement between the pipes,

sealably connecting outer ends of the inner and outer pipes to respective walls of said framework such that the gap between the pipes permits relative movement of the walls, and

sealing said gap during said movement by said foam material, a portion of which, extends out of the inner pipe and presses against the inner surface of the outer pipe while the remainder of the foam material remains in the inner pipe, under pressure, in sealed relation with the inner surface of the inner pipe.

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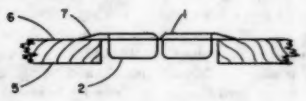
4,712,343

## INTERIOR AIR VENT SHIELD

J. C. Dearing, 736 Fiesslers La., Nashville, Tenn. 37210, and Donald R. Rich, 2817 Desplane Dr., Nashville, Tenn. 37217

Filed May 27, 1986, Ser. No. 867,146
Int. Cl.[4] E04F 15/024
U.S. Cl. 52—221 1 Claim



1. A shield for covering interior air vent openings during construction of residential or commerical buildings comprising:

a. a rectangular floor plate sized to cover the largest of standard floor vent openings, the width of said plate being slightly greater than twice the width of a standard baseboard vent opening;

b. a rectangular block attached to or formed with said plate along their respective largest planar surfaces, generally centrally located on and parallel aligned with said plate but having smaller outside dimensions which are slightly smaller than the smallest standard floor vent opening; and

c. a groove for facilitating cutting or breaking of said shield, said groove linearly and centrally located along the lower planar surfaces of said plate and block, said groove extending partially into said plate and block, and aligned and parallel with the longest outside edges of said plate and block.

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4,712,344

## DOME SLAB BUILDING STRUCTURE AND METHOD

Karoly Erdei, 1607-C Amberwood Dr., South Pasadena, Calif. 91030

Continuation of Ser. No. 722,612, Apr. 12, 1985, abandoned. This application Apr. 15, 1987, Ser. No. 40,764
Int. Cl.[4] E04C 3/10
U.S. Cl. 52—223 R 25 Claims

1. A building structure comprising:

a series of support columns projecting upwardly at different locations about a region and spaced apart along the periphery of said region; adn

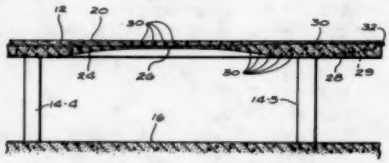
a floor supported locally at said locations by said spaced columns and extending from said columns across said region;

said floor including a monolithic integrally cast body of

concrete having a top surface for supporting a load and having a bottom surface which, as it extends inwardly across said region from the periphery thereof, is shaped to form a shallow concave dome recess in the underside of said body;

the thickness of said body of concrete between said top and bottom surfaces increasing progressively and gradually in all directions outwardly from a crown portion of the dome recess to the preiphery thereof;

the ratio of the diameter of a circle having an area equal to the area of the floor over the dome recess to the height of the dome recess at said crown portion being at least about 20 to 1;




said floor including a plurality of tendons extending within said body of concrete across said region and through the concrete body above said dome recess;

the individual tendons, in extending across said region within said concrete boyd, being bowed to advance first gradually away from said top surface from one side of said region toward an intermediate location above the dome recess and then gradually closer to said top surface toward the opposite side of said region, and being tensioned to apply an upward biasing force and a lateral compressive force on the body of concrete across said region and above said dome recess.

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**4,712,345**

## APPARATUS FOR CONNECTING CURTAIN WALL UNITS

**Hiromitsu Kaminaga, Kurobe, Japan, assignor to Yoshida Kogyo, K. K., Tokyo, Japan**

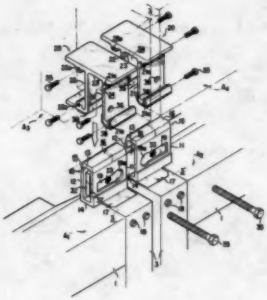
**Filed Apr. 24, 1986, Ser. No. 855,390**

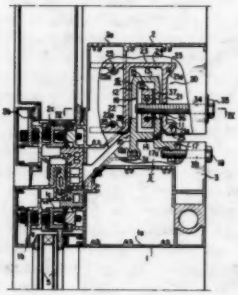
**Claims priority, application Japan, May 8, 1985, 60-66861[U]**

**Int. Cl.[4] E04B *1/40***

**U.S. Cl. 52—235** **9 Claims**

1. An apparatus for connecting curtain wall units, which are juxtaposed vertically and horizontally in a vertical plane, at a portion where four corners of said curtain wall units gather with one another in such a manner as to permit individual in-plane correlative displacement of each of said curtain wall units and restrict out-of-plane correlative displacement thereof, said apparatus comprising a pair of first coupling members fixed to upper edge portions of a pair of horizontally adjacent lower positioned curtain wall units, respectively, said first coupling members each having either one of a projecting portion and a recessed portion adapted to be engaged with each other in such a manner that in-plane correlative displacement of the curtain wall units in the vertical and horizontal directions in said vertical plane is permitted, while out-of-plane correlative displacement thereof is restricted; a pair of second coupling members fixed to lower edge positioned curtain wall units, respectively, in such a manner as to be arranged in opposed relation with said first coupling members, said second coupling members each having the other of said projecting portion or recessed portion; a connecting plate provided across each of the pairs of said first and second coupling members; through-holes formed through one of said pairs of said first or second coupling members, respectively; and bolts inserted through said through-holes for fixedly connecting said connecting plate and the other of said pairs of said first and second coupling members with the one pair of coupling members sandwiched between said connecting plate and said other pair





of coupling members, said through-holes having a size permitting vertical and horizontal movement of said bolts.

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**4,712,346**

## METHOD FOR LAYING BRICKS IN A HERRINGBONE PATTERN, AND AN ACCORDINGLY MANUFACTURED BRICK STRUCTURE

**Arend Luitjen, Mercuriusstraat 2, 3204 BM Spijkenisse, Netherlands, assignor to Arend Luijten, Spijkenisse and Robert de Vries, The Hague, both of, Netherlands, a part interest to each**

**Filed May 14, 1986, Ser. No. 863,138**

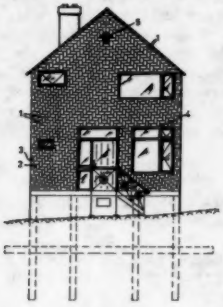
**Claims priority, application Netherlands, May 15, 1985, 8501399**

**Int. Cl.[4] E04C *1/00*; E01C *5/06***

**U.S. Cl. 52—311** **1 Claim**

1. An elevated brick structure, wherein the bricks are ar-

ranged in a herringbone pattern of alternate herringbone layers in which rectangular bricks are either in a horizontally



stretched position or in an upstanding position forming twilled rows of bricks at an incline of 45°.

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**4,712,347**

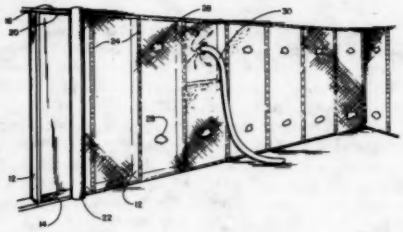
**METHOD AND APPARATUS FOR CONTAINING INSULATION USING NETTING**

**Henry V. Sperber, 8 Red Fox La., Englewood, Colo. 80111**

**Filed Oct. 31, 1986, Ser. No. 925,309**

**Int. Cl.[4] E04B *1/74***

**U.S. Cl. 52—404** **15 Claims**



**1.** A method for placing loose fill insulation in a support frame of a building, comprising:

forming a support frame;

providing a netting from material having a predetermined degree of flexibility and netting holes;

attaching said netting to said support frame;

forming at least a first access hole in said netting;

feeding loose fill insulation between said netting and a portion of said support frame using said first access hole wherein said netting bulges out when sufficient loose fill insulation has been received;

observing said bulging out of said flexible netting as a signal that a sufficient amount of insulation has been fed between said netting and said portion of said support frame; and

discontinuing said feeding of said insulation.

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**4,712,348**

**NON-PENETRATING ROOF SYSTEM**

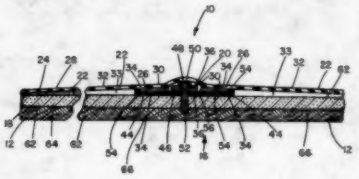
**Charles S. Triplett, 1520 Fairway Ct., Fort Wayne, Ind. 46825, and John D. Gray, R.R. #2, Avilla, Ind. 46710**

**Filed Jun. 13, 1986, Ser. No. 873,958**

**Int. Cl.[4] E04B *7/00, 5/00***

**U.S. Cl. 52—408** **23 Claims**

**1.** A roof structure comprising roof base, a plurality of flexible retention sheets, said retention sheets having inner and outer portions, a plurality of battans, said battans being positioned on said inner portions of said retention sheets and being secured to said base, said inner portions being between said battans and said base, said outer portions being on opposite sides of said battans and being moveable toward and away from said base, and a flexible imperforate cover membrane



overlaying said battans and retention sheets, said membrane being bonded to said outer portions and secured to said roof base at its periphery, whereby said bonded membrane and retention sheet portions are integral.

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**4,712,349**

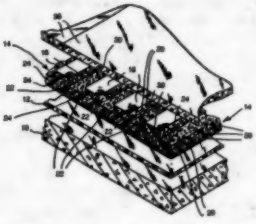
**PROTECTED MEMBRANE ROOF SYSTEM FOR HIGH TRAFFIC ROOF AREAS**

**Elizabeth Riley, Newark, and Wayne E. Petersen, Granville, both of Ohio, assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 686,069, Dec. 24, 1984, Pat. No. 4,658,554. This application Feb. 5, 1987, Ser. No. 11,664**

**Int. Cl.[4] E04B *5/00***

**U.S. Cl. 52—408** **7 Claims**



**1.** A roofing system comprising a roof deck, a waterproof membrane above said roof deck, a plurality of panels of foam plastic insulation overlying said waterproof membrane,

each of said foam plastic insulation panels having bounding perimetric edges and edge surfaces and having a planar lower surface and a plurality of flat-topped, parallel, raised, elongated ribs on an upper face thereof, and spaced apart by grooves,

said ribs being integral with said panels and defining zonal sectors which are stiffer, stronger, and more resistant to deformation than a remainder of each panel,

said grooves in said panels comprising channels including bounding sidewalls and base walls derived upon excision of laterally-spaced elongated, lineal sections from said panels transversely thereof,

said bounding sidewalls and said base walls being formed with crater-like recesses in exposed surfaces thereof and opening outwardly of said walls,

said ribs having tops forming a discontinuous planar surface substantially parallel to said lower surface,

a waterproof plastic film having peripheral edges coincident with said bounding perimetric edges of a respective panel and being coextensive with and bonded to only the lower surface thereof, and resting on said waterproof membrane in an unsecured, face-to-face contacting relation,

each of said panels being otherwise free of plastic film and exposed to ambient air for evaporation of moisture,

said plurality of panels being in substantially abutting relation at edges thereof, and

a plurality of concrete panels carried on said foam plastic insulation panels and resting on said rib top discontinuous planar surface.

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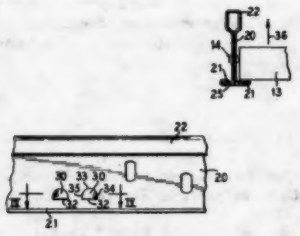
4,712,350

## CENTERING ARRANGEMENT FOR T MEMBERS OF A SUSPENDED CEILING

Ronald W. Vukmanic, Naperville, Ill., assignor to Chicago Metallic Corporation, Chicago, Ill.

Filed May 16, 1986, Ser. No. 864,160
Int. Cl.[4] E04B 5/52
U.S. Cl. 52—484 7 Claims



1. A runner member having an inverted T configuration with a vertical web and two outwardly extending flanges adjacent a bottom edge of the web, said runner member being used with other runner member to form a ceiling system having rectangular openings receiving panels, each of said runner members having means for centering the panel in the rectangular opening, the improvement comprising said means for centering comprising a pair of oppositely extending bumps, each bump being adjacent a cut through the web extending parallel to the flange of the member, said bump having a substantially semi-circular configuration and providing curved camming surfaces for moving a member away from the web as the member moves towards the flange and also laterally along the flange and each bump and cut forming a smooth continuous edge with curved portions which will not interfere with lateral and downward movement of the panel relative to the runner.

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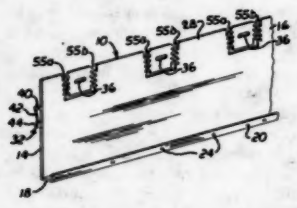
4,712,351

## VINYL SIDING

David P. Kasprzak, St. Petersburg, Fla., assignor to The Celotex Corporation, Tampa, Fla.

Filed Nov. 10, 1986, Ser. No. 929,117
Int. Cl.[4] E04C 1/06
U.S. Cl. 52—573 4 Claims



1. In a building siding unit comprising a sheet having an upper portion having a plurality of spaced, horizontally elongated, aligned fastener receiving slots disposed therein, an interlock receiver channel disposed on said upper portion and spaced from said plurality of fastener receiving slots, the improvement comprising isolation means disposed in a U-shaped configuration partially around at least some of said aligned fastener receiving slots and in an area above said interlock receiver channel, said isolation means comprising vertical stress relief means at each side of at least some of said fastener receiving slots, said vertical stress relief means comprising a series of thin strips of said sheet and an elongated slot lying below corresponding ones of said fastener receiving slots and spanning the distance between said stress relief means, whereby said isolation means serves as a means to ameliorate the effects of expansion and contraction of said building siding unit caused by changing weather conditions.

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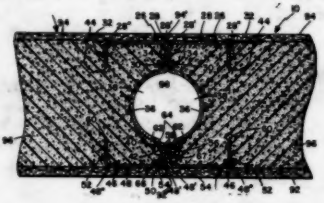
4,712,352

## MODULAR CONSTRUCTION SYSTEM

R. Glenn Low, 1911 Meadowview Rd., Bloomington, Minn. 55420

Filed Dec. 4, 1985, Ser. No. 804,429
Int. Cl.[4] E04C 2/34; E04F 17/00
U.S. Cl. 52—809 7 Claims



1. A panel for a modular wall assembly comprising:

a frame (14) having a first vertical structural unit (16) and a second vertical structural unit (18) and connecting means (20, 22) for rigidly connecting said first structural unit (16) to said second structural unit (18);

each of said structural units having a pair of generally parallel spaced apart first and second side plate members (28, 48) and a pair of vertical edge plate members (34, 54) perpendicular to said side plate members with a first (34) of said edge plate members extending inwardly from an outer edge (28') of said first side plate member (28) and with a second (54) of said edge plate members extending inwardly from an outer edge (48') of said second side plate member (48); at least one (34) of said edge plate members having an inwardly protruding conduit defining portion (36) disposed spaced from said side plates (28, 48); thermal barrier means (62) for rigidly connecting free ends (42, 58) of said edge plate (34, 54) members in thermally insulated connection;

facing sheets (92, 94) secured to outer surfaces of said side plate members (28, 48) of said first structural unit and extending to and secured to outer surfaces of side plate members of said second unit;

fastening means (72, 78) disposed completely between said facing sheets (92, 94) for rigidly connecting said first structural unit of said panel to a second structural unit of a contiguous panel with vertical edge plate members (34, 54) of said panel and said contiguous panel abutting and with opposing conduit defining portions (36) having opposing surfaces defining a completed conduit (98) disposed between said facing sheets (92) and in spaced relation thereto;

said thermal barrier means including a first thermal barrier element connecting edge plate members of said first structural unit (16) and a separate second thermal barrier element connecting edge plate members of said second structural unit (18), said first and second thermal barrier elements disposed to define a first thermal barrier of said panel and a second thermal barrier of said contiguous panel so as to abut when said panel and said continguous

panel are joined edge to edge to form a composite panel with abutting thermal barrier elements defining a composite thermal barrier; and

rigid foam insulation disposed within said panel and filling a volume defined by opposing surfaces of said facing sheets (92), side plate members (28, 48) and edge plate members (34, 54).

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4,712,353

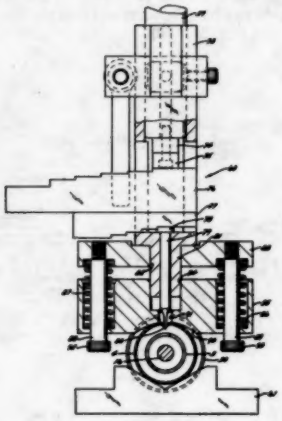
## GAS PRESSURIZED SHOCK ABSORBER ASSEMBLY

Michael R. Bethell, Monroe; Michael G. Gaines; James F. Mowat, Jr., both of Temperance, all of Mich.; Roger D. Wheeler, Sylvania, and Richard P. Woidke, Toledo, both of Ohio, assignors to Monroe Auto Equipment Company, Monroe, Mich.

Division of Ser. No. 383,949, Jun. 1, 1982, abandoned. This application May 14, 1984, Ser. No. 610,262

Int. Cl.[4] B65B *31/04*

U.S. Cl. 53—80 1 Claim



1. Apparatus for gas pressurizing a sealed shock absorber assembly, said assembly having a weldable metal outer shell, said apparatus comprising, in combination:

a first work station having means for piercing an opening in said weldable metal outer shell of said shock absorber assembly;

a second work station having chamber means for sealingly engaging a continuous annular portion of said outer shell surrounding said opening, gas charging means for passing gas through said chamber means and said pierced opening into an interior portion of said outer shell, plug handling means for moving a weldable plug into said chamber and placing said plug on said portion of said outer shell surrounding said opening and welding means for welding said plug to said outer shell to seal said pierced opening; and

shock absorber assembly moving means for moving a shock absorber assembly to said first work station and then to said second work station, said moving means having a plurality of shock absorber assembly holding fixtures for maintaining each shock absorber assembly in a fixed position with respect to its holding fixture;

whereby a sealed, unpressurized shock absorber assembly is positioned in a fixture, moved by said moving means to said first work station where an opening is pierced in the outer shell of the assembly, the moving means moves said assembly to said second work station, said shock absorber assembly is gas pressurized, a plug is placed over the pierced opening, the plug is welded to the outer shell surrounding said opening and the now gas pressurized and resealed shock absorber assembly is moved by said moving means to a position for removal from said holding fixture.

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4,712,354

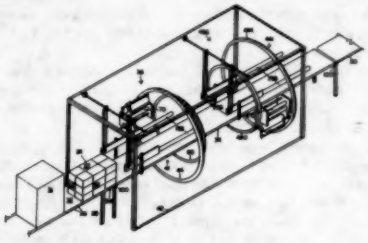
## DUAL ROTATING STRETCH WRAPPING APPARATUS AND PROCESS

Patrick R. Lancaster, and William G. Lancaster, both of Louisville, Ky., assignors to Lantech, Inc., Louisville, Ky.

Continuation of Ser. No. 582,779, Feb. 23, 1984, abandoned. This application Sep. 4, 1986, Ser. No. 903,896

Int. Cl.[4] B65B *13/12*

U.S. Cl. 53—399 33 Claims



1. An apparatus for wrapping a load to contain the load comprising:

wrapping conveyor means for conveying the load and a wrapped web in a longitudinal direction relative to first and second film dispensing means;

said first film dispensing means having means for stretching and wrapping a first web around the load and onto at least part of the wrapping conveyor means, means for rotating said first dispensing means in a first circumferential direction around the load while the load is conveyed in the longitudinal direction relative to the first film dispensing means to form a first helical layer which is formed and biased in a first helical direction;

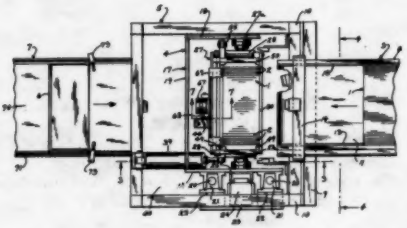
said second film dispensing means having means for stretching and wrapping a second web around the load and onto the first helical layer of web, means for rotating said second dispensing means in a second circumferential direction around the load opposite the first circumferential direction while the load is conveyed in the longitudinal direction relative to the second film dispensing means to form a second helical layer which is formed and biased in a second helical direction opposite the first helical direction, and for producing in combination with the first helical layer a containment force on the wrapped conveyor means having longitudinal and circumferential components without a substantial helical component, at least one of the longitudinal and circumferential components being substantial; and

means for transferring the first and second helical layers as a unit from the wrapping conveyor means onto the load to apply a containment force on the load having longitudinal and circumferential components without a substantial helical component, at least one of the longitudinal and circumferential components being substantial.

## 4,712,355
## METHOD AND APPARATUS FOR LOADING ARTICLES INTO A CONTAINER

**Wolfgang C. Dorner, Oconomowoc; Michael A. Hosch, Hartland, and Mark C. Wedell, Delafield, all of Wis., assignors to Dorner Mfg. Corp., Hartland, Wis.**

**Filed Mar. 2, 1987, Ser. No. 20,395**
**Int. Cl.[4] B65B** *5/04, 5/06*
**U.S. Cl. 53—443** **20 Claims**



1. An apparatus for feeding an article into a container, comprising article receiving means having an open end to receive an article and having a second end, movable closure means for closing said second end and movable between a first closed position where said closure means is disposed to be engaged by an article being received within said open end to a second open position, operating means for moving said closure means between the closed and open positions, mounting means for mounting said article receiving means for rotation about a horizontal axis from an article receiving position to a discharge position where said second end faces downwardly, means for moving said article receiving means between the receiving position and the discharge position, clamping means for clamping the article within the article receiving means, and release means for releasing the clamping means after said closure means has been moved to said open position to thereby permit said article to be discharged from said article receiving means through said second end.

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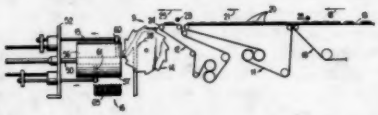
## 4,712,356
## TRAY LOADER

**Timothy W. Hardage, Athens; Charles T. Haley, Watkinsville, and William D. Walker, Athens, all of Ga., assignors to Food Machinery Sales, Inc., Athens, Ga.**

**Continuation-in-part of Ser. No. 677,745, Dec. 3, 1984, Pat. No. 4,590,743. This application May 23, 1986, Ser. No. 866,868**
**The portion of the term of this patent subsequent to May 27, 2003, has been disclaimed.**
**Int. Cl.[4] B65B** *35/44, 35/50*
**U.S. Cl. 53—446** **17 Claims**



1. A method of loading cookies and the like each having substantially flat bottom surface and an opposed irregularly shaped upper surface in a receptacle comprising the steps of

moving a plurality of cookies each resting on its bottom surface in an aligned series with a first surface conveyor means at a first velocity toward a second surface conveyor means,

transferring the cookies from the first surface conveyor means to the second surface conveyor means with the cookies each resting on its bottom surface on the second surface conveyor means,

moving the cookies with the second surface conveyor means at a second velocity which varies with respect to the first velocity to a reorienting means in timed relationship with said reorienting means,

retrieving the cookies with the reorienting means from the second surface conveyor means and reorienting the cookies to an edge standing attitude and aligning the cookies with a cell of a transfer member,

engaging with the reorienting means the flat bottom surface of each cookie to urge the cookies into the cell of the transfer member, and

after a predetermined number of cookies have been urged into the cell of the transfer member transferring the stack of cookies from the transfer member to a cell of a receptacle.

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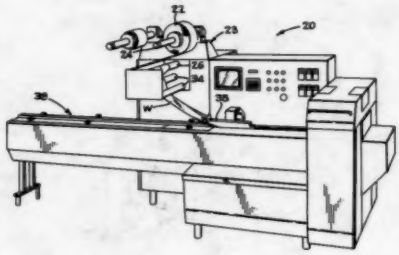
## 4,712,357
## COMPUTER CONTROLLED HORIZONTAL WRAPPER

**Donald C. Crawford, Green Bay; Jeffrey L. Ross, Pulaski; Gary P. Strike, Appleton, and Steven W. Mory, Green Bay, all of Wis., assignors to FMC Corporation, Chicago, Ill.**

**Filed Oct. 28, 1985, Ser. No. 792,084**
**Int. Cl.[4] B65B** *9/06, 57/04*
**U.S. Cl. 53—450** **2 Claims**



1. A method of operating a horizontal wrapping machine comprising a supply drive motor for supplying a succession of regularly spaced articles into a tubular web, means for feeding and sealing the margins of the formed web, and means for transversely sealing and cutting the web tube to produce packages having at least one article contained therein, the method comprising the steps of:

generating a signal representative of the velocity and position of the article supply drive motor;

digitizing the velocity and position signal; and

using the digitized representative velocity and position signal to control the velocity of the feeding and sealing and cutting motors.

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## 4,712,358
## PRODUCTION OF TEA AND THE LIKE BAGS

**James R. Rimmer, Wirral, and Ronald M. Sweeney, West Kirkby, both of England, assignors to Premier Brands U.K. Limited, Birmingham, England**

**Filed Apr. 8, 1986, Ser. No. 849,480**
**Int. Cl.[4] B65B** *9/02, 29/02*
**U.S. Cl. 53—450** **19 Claims**

1. A machine for producing tea bags, comprising:

means for moving first and second webs of material through the machine,

means for placing individual portions of tea on the first web as it moves through the machine so that said tea portions are spaced transversely of the web length,

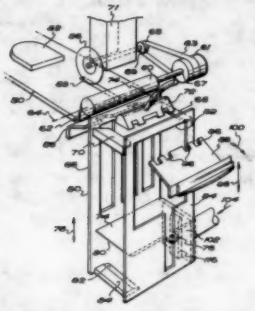
means for applying the second web over the first web and over said portions of tea,

means for sealing said first and second webs together around

said tea portions to form two parallel rows of connected tea bags,

means for severing the webs transversely so as to provide side by side but separated pairs of tea bags,

a magazine for receiving said pairs of tea bags on top of each



other to define therein two separated sideby side tea bag stacks, and

means for displacing the tea in the bags to the sides of the bags remote from a longitudinal center line of the webs during travel of the webs through the machine and prior to insertion of the bags in the magazine.

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**4,712,359**

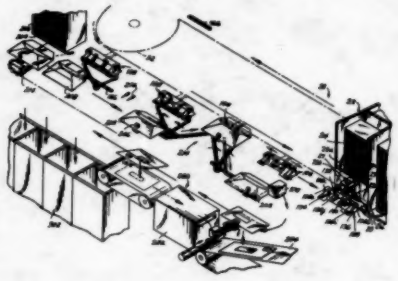
## MAIL INSERTING AND COLLATING APPARATUS

**John A. DePasquale, New York; Ivar R. Segalowitz, Great Neck, and Ceasar P. Andolfi, Bellerose, all of N.Y., assignors to J.A.D. Enterprises, Inc., New York, N.Y.**

**Filed Oct. 14, 1986, Ser. No. 918,578**

**Int. Cl.[4] B65B** *5/04, 25/14*

**U.S. Cl. 53—460** **24 Claims**



20. A method of inserting mailing inserts into envelopes, comprising the steps of:

supplying said envelopes to at least one envelope carrier means for holding said envelopes;

clamping each supplied envelope in a respective carrier means with first clamping finger means secured to the respective envelope carrier means;

moving said envelopes clamped to said envelope carrier means along a first path;

supplying said inserts to at least one pocket means for holding said inserts;

moving said inserts in said pocket means along a second path in which at least a portion of said second path runs substantially parallel and adjacent to said first path;

moving each envelope carrier means toward a respective pocket means at an insert and envelope merge station to move said pocket means into said envelope; and

clamping said envelope and inserts received in said envelope at said insert and envelope merge station with second clamping finger means secured to the respective envelope carrier means.

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**4,712,360**

## MACHINE FOR FILLING BAGS WITH A LIQUID AND SEALING THEM

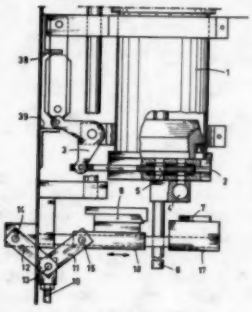
**Guido Bertoglio, Viganello, Switzerland, assignor to Water Line S.A., Mezzovico, Switzerland**

**Continuation of Ser. No. 772,644, Sep. 4, 1985, abandoned. This application Sep. 3, 1986, Ser. No. 903,850**

**Claims priority, application Switzerland, Sep. 24, 1984, 4552/84**

**Int. Cl.[4] B65B** *9/10, 43/30*

**U.S. Cl. 53—567** **2 Claims**



1. Machine for filling bags with a liquid and sealing them, comprising:

liquid proportioning means;

a pair of jaws adapted to open substantially along a given direction, said pair of jaws having suction means for holding the upper lips of a bag by partial vacuum, said pair of jaws being mounted beneath said liquid proportioning means;

a toggle joint comprising two pivotally interconnected links and an actuating member connected to said joint at said pivotal interconnection, each said link having an end remote from said pivotal interconnection and said actuating member being displaceable in a direction substantially perpendicular to said given direction; at least one of said remote ends being pivotally connected to one of said pair of jaws; said pair of jaws being closed when said links are extended relative to one another, and open when said links are more nearly collapsed relative to one another; whereby displacement of said actuating member in said perpendicular direction at a constant rate will open said closed jaws at a progressively increasing rate;

and a manually operable pedal for pulling said actuating member in a direction to open said jaws.

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**4,712,361**

## COLLATION ASSEMBLIES

**Bhushan K. Oberoi, Horley, United Kingdom, assignor to Redland Roof Tiles Limited, Surrey, England**

**Filed Jul. 5, 1985, Ser. No. 751,911**

**Claims priority, application United Kingdom, Jul. 6, 1984, 8417249**

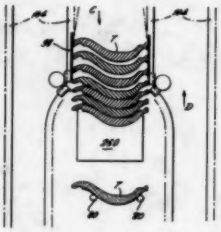
**Int. Cl.[4] B65G** *57/14, 49/05*

**U.S. Cl. 53—540** **18 Claims**

1. Apparatus for collating and stacking manufactured building components, comprising:

a plurality of pairs of opposed shelf means, each shelf means being movable up and down and each shelf means of the opposed pairs of shelf means movable towards and away from each other;

conveyor means for feeding components to the shelf means;
means for moving the shelf means up or down in timed relation to the movement of the conveyor thereby to locate the components on the shelf means, opposed edges of each component being supported by a pair of shelf means;
a support for a stack of components, the support being vertically movable relatively to the shelf means;
shelf positioning means for moving opposed pairs of shelf means apart, said shelf-positioning means being movable



up and down with respect to said shelf means, for moving pairs of shelf means apart in timed relation to relative downward or upward movement between the shelf means and the shelf-positioning means thereby to release the components and stack them on the support; and
means for effecting relative movement between the shelf-positioning means and the shelf means,
said shelf means, shelf-positioning means and support being relatively movable vertically in a timed relationship which effects the stacking of the components without undue shocks to the components.

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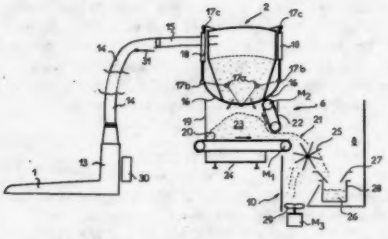
**4,712,362**
**HARVESTER FOR EXPERIMENTAL PLOTS OF GROUND**

**Michel Cornet, Avon, and Pierre Michel, Ormesson, both of France, assignors to Institut Technique des Cereales et des Fourrages, Paris; Association Generale des Producteurs de Mais, Pau and Ateliers Rolland S.A., Chateau du Loir, all of, France**

**Filed Mar. 4, 1986, Ser. No. 836,137**
**Claims priority, application France, Mar. 6, 1985, 85 03312**
**Int. Cl.[4] A01D *41/02***
**U.S. Cl. 56—16.5** **8 Claims**



1. A harvester for collecting a product from experimental plots of ground comprising
first and second modules mounted on a self driven vehicle;
said first module including
a collecting-chopping means including a gathering nose,
an injection duct connected to said collecting-chopping means,
and an opening stand-by hopper connected to an opposite end of said injection duct from said collecting-chopping means;
said second module including
means for weighing and means for sampling the collected product,
a conveyor associated with said weighing means disposed in line with an opening in said stand-by hopper,
means for equalizing the load of the collected product transported by said conveyor associated with said weighing means,
said equalizing means and said conveyor associated with said weighing means forming an outlet to said sampling means,
said sampling means including
a sample conditioning station and said sampling means also having an outlet in said sampling means and a means for discharging the collected product collected from each plot in said outlet of said sampling means;
a first control station connected to a means to advance said vehicle and to a means to open said opening in said stand-by hopper;
a second control station connected to said conveyor associated with said weighing means, to said equalizing means, and to said sampling means;
said weighing means connected to one of said control stations.

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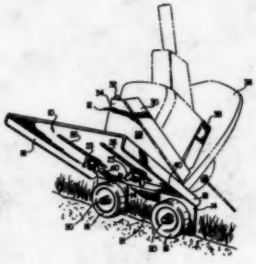
**4,712,363**
**APPARATUS FOR CONVERTING A FLEXIBLE LINE TRIMMER FOR USE AS A LAWN EDGER**

**Morris W. Claborn, Dallas, Tex., assignor to Wedger, Inc., Dallas, Tex.**

**Filed Sep. 12, 1986, Ser. No. 906,516**
**Int. Cl.[4] A01D *34/84***
**U.S. Cl. 56—16.7** **11 Claims**

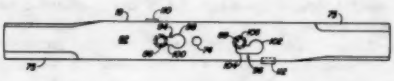


1. An apparatus for converting a flexible line trimmer for use as a lawn edger comprising:
(a) a wheel-plate including:
a planar sheet member;
first and second struts extending from an edge of said sheet member and being disposed at an obtuse angle with respect to said sheet member;
a wheel attached to each of said struts;
an arm extending from said edge of said sheet member; and
a lip extending from an end of said arm;
(b) first and second flange members each having a flange surface;
(c) fasteners to adjustably and fixably connect said wheel-plate and said first and second flange members;
(d) a strap connected to said wheel-plate and having means for fastening the strap around the flexible line trimmer; and
(e) said lip, flange surfaces and strap being located to connect the apparatus to a flexible line trimmer.

## 4,712,364
## QUICK ATTACHABLE AND DETACHABLE MOWER BLADE ASSEMBLY

**Lonnie R. Oxley, West Bend, Wis., assignor to Deere & Company, Moline, Ill.**

**Filed Jun. 30, 1986, Ser. No. 880,462**
**Int. Cl.[4] A01P** *34/73*
**U.S. Cl. 56—295** **8 Claims**

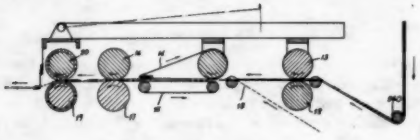


1. A quick attach blade assembly for use on a grass cutting mower having a vertical rotatably driven main shaft with a lower end portion, said assembly comprising: a vertical locking pin supported in the lower end portion of said shaft by biasing structure that yieldably holds said pin in a lowermost position in which the lower end of the pin projects downwardly of the lower end portion of the shaft; a blade holder fixed to the lower end portion of said shaft, and projecting radially to opposite sides thereof, said holder having a lower blade-contacting surface and a central opening through which said pin projects; a pair of headed studs fixed to the holder and offset radially from and on opposite sides of the central opening, said studs having the heads spaced downwardly from said lower surface; a mower blade having opposite ends and a central pin-receiving opening, and said blade a pair of stud openings with each of the stud openings having an enlarged portion for passing the head of a respective stud and a narrow portion extending from the enlarged portion to an end conforming to the shape and dimension of the shanks of its respective stud, one of said narrow portions being located and directed so as to prevent radial movement in either direction between the holder and blade, and the other of said narrow portions being located and directed so as to prevent angular movement between the holder and blade.

## 4,712,365
## PROCESS FOR THE MANUFACTURE OF REINFORCED FALSE TWIST YARNS

**Fernando F. Ferrer, Anselmo Clavé , 6 Calella (Barcelona), Spain**

**Continuation of Ser. No. 759,149, Jul. 26, 1985, abandoned. This application Oct. 2, 1986, Ser. No. 914,518**
**Claims priority, application Spain, Jul. 27, 1984, 534.967**
**Int. Cl.[4] D01H** *5/28;* **D02G** *3/26, 3/36*
**U.S. Cl. 57—12** **3 Claims**



1. A process for manufacturing reinforced false twist yarns, comprising:

supplying a first and a second fiber roving;

supplying a continuous fiber yarn;

providing a pair of braking rolls to cause drag on said first and said second roving;

passing said first and said second roving between said pair of braking rolls;

providing a pair of drawing bands; passing said first and said second roving between said pair of drawing bands, and introducing said continuous fiber yarn between said pair of drawing bands;

providing a pair of pulling rollers to pull said first and said second roving and said continuous fiber yarn; passing said first and said second roving and said continuous fiber yarn between said pair of pulling rollers to cause drawing of said first and said second roving;

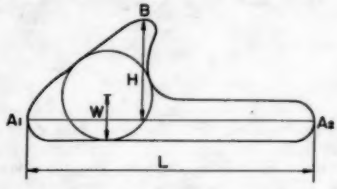
providing a pair of twisting rollers to cause twisting of said first and second rovings;

whereby said continuous fiber yarn undergoes substantially less drawing than said first and said second roving due to the effect of said pair of braking rolls on said first and said second roving.

## 4,712,366
## DENIER-MIXED COMPOSITE YARN, DENIER-MIXED SPECIAL THICK AND THIN YARN, FALSE TWIST YARN AND DENIER-MIXED SHRINKAGE-MIXED COMPOSITE YARN

**Keizo Tsujimoto; Takashi Katagiri; Eiji Ichihashi, and Hitoshi Otsubo, all of Okazaki, Japan, assignors to Nippon Ester Co., Ltd., Aichi, Japan**

**Filed Dec. 22, 1986, Ser. No. 945,382**
**Claims priority, application Japan, Dec. 28, 1985, 60-298563; May 19, 1986, 61-114083**
**Int. Cl.[4] D02G** *3/22, 3/24, 3/38, 1/02*
**U.S. Cl. 57—245** **16 Claims**




1. A denier-mixed composite yarn containing 20 weight percent or more coarse filaments whose single filament fineness is 3 deniers or more and 5 weight percent or more fine filaments whose single filament fineness is 1.5 denier or less, characterized in that part or all of said coarse filaments are of non-circular cross-section, the stress of said composite yarn at 10% elongation is 2.5 g/d or less, and the following relations (I) and (II) are satisfied:

$$E_{max} - E_{min} \geqq 20(\%) \quad \text{(I)}$$

$$E_{i+1} - E_i \leqq 20(\%) \quad \text{(II)}$$

Where $E_{max}$ is the elongation (%) of the maximum elongation single filament constituting the composite yarn, $E_{min}$ the elongation (%) of the single filament exhibiting minimum elongation, $E_i$ the elongation (%) of any single filament (excluding the maximum elongation single filament) constituting the composite yarn, and $E_{i+1}$ the elongation (%) of the single filament which exhibits elongation greater than and closest to $E_i$.

## 4,712,367
## METHOD AND DEVICE FOR FORMING A THREAD JOINT

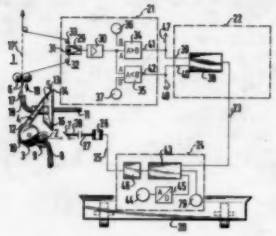
**Manfred Lassmann, Nettetal, Fed. Rep. of Germany, assignor to W. Schlafhorst & Co., Monchen-Gladbach, Fed. Rep. of Germany**

**Filed Nov. 4, 1985, Ser. No. 794,757**
**Claims priority, application Fed. Rep. of Germany, Nov. 2, 1984, 3440009**
**Int. Cl.[4] D01H** *15/02*
**U.S. Cl. 57—263** **20 Claims**

1. Method of forming a thread joint in an open-end spinning machine having a sliver drawing-in device for drawing in a sliver and feeding it to a fiber loosening device from which it

is guided by a fiber guiding device to a fiber accumulator at which the fibers are accumulated, disentangled, imparted with a rotary motion, and thereafter engaged with an open end of a thread, and a take-up device for drawing the thread out of the fiber accumulator, which comprises, for the purpose of forming a joint, bringing a thread end which is fed back into the fiber accumulator into contact with a quantity of fibers to be joined which have been previously fed into the fiber accumulator, continuously withdrawing the thread out of the fiber accumulator and continuously feeding fibers into the accumulator, continuously measuring thickness of the joints and automatically controlling the quantity of fibers being joined which is necessary for producing a joint having a given acceptable thickness.

10. Joining device capable of traveling and forming a joint in an open-end spinning machine having a sliver drawing-in



device for drawing in a sliver and feeding it to a fiber loosening device, a fiber guiding device for guiding the sliver then to a fiber accumulator for accumulating, disentangling, imparting a rotary motion to, and thereafter engaging the sliver with an open end of a thread, a take-up device for drawing the thread out of the fiber accumulator, means for feeding a thread end, for the purpose of forming a joint, back into the fiber accumulator into contact with a quantity of fibers to be joined which had been previously fed into the fiber accumulator, means for continuously withdrawing the thread from the fiber accumularot and means for continuously feeding fibers into the fiber accumulator the joining device comprising an automatic joint thickness measuring device connected to a joint thickness monitor, and a metering device for quantities of fibers to be joined which is controllable in accordance with a mean thickness of the joints, said metering device being operatively connected to said thickness monitor.

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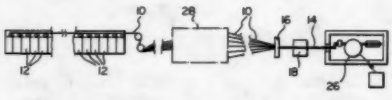
**4,712,368**

## MANUFACTURE OF TELECOMMUNICATIONS CABLE CORE UNITS

**John N. Garner, Kingston, Canada, assignor to Northern Telecom Limited, Montreal, Canada**

**Filed Mar. 30, 1987, Ser. No. 31,295**
**Int. Cl.[4] H01B *13/04***
**U.S. Cl. 57—314** **12 Claims**



1. Apparatus for forming a core unit from telecommunications conductor units in which each conductor unit is formed of twisted together insulated conductors, the apparatus comprising:

a plurality of arcuate position changing means for conductor units, each position changing means for moving an individual conductor unit laterally as it is moved along an individual passline, the position changing means located in spaced side-by-side relationship in series in the general direction of passlines for conductors to extend around a volumetric space;

each position changing means comprising a movable conductor unit guide, a guide mounting means providing an arcuate path for movement of the movable guide into four quadrants around the volumetric space, and driving means drivably connected to the movable guide to move the guide alternately in one direction and then in the other around the arcuate path and into all four quadrants around the volumetric space;

fixed guide means disposed upstream of the plurality of position changing means, the fixed guide means defining an individual fixed guide surface for each conductor unit and cooperating with an associated movable guide to control movement of the conductor unit along its feedpath through the volumetric space and through a gap between position changing means for any position of the movable guide on its arcuate path, the fixed guide surfaces relatively disposed to avoid twisting together of conductor units in the volumetric space during movement of the movable guides along the arcuate paths;

an array forming means having a smooth convex conductor engaging surface extending transversely of the general direction of the passlines and in line with and downstream of the series of position changing means for holding the conductor units in an arcuate array while enabling relative positional change of the units around the array as the movable guides move individually on their arcuate paths; and

a core unit forming and take-up means to draw the conductor units together to form the core unit.

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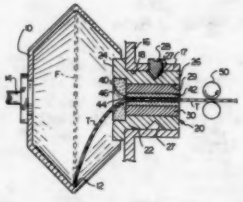
**4,712,369**

## YARN TREATING DEVICE FOR OPEN-END SPINNING FRAMES

**Thomas Vernon, Greensboro, N.C., assignor to Burckhardt America, Inc., Greensboro, N.C.**

**Filed May 11, 1987, Ser. No. 48,212**
**Int. Cl.[4] D01H *7/882, 1/135***
**U.S. Cl. 57—417** **5 Claims**



1. A navel member adapted for attachment in the cover of an open-end spinning rotor for guiding thread formed in the fiber collecting groove of said spinning rotor of an open-end spinning machine therethrough to a take-up mechanism, said navel member including:

(a) a support housing having a head at the upstream end and a barrel protruding in a downstream direction from the rear side of said head, said barrel including a passageway therethrough, the axis of said passageway extending substantially along the thread path as it exits said spinning rotor, means associated with said barrel for mounting said housing in position adjacent the spinning rotor;

(b) a ceramic throat piece embedded in the front surface of said head and including a central guide orifice therein for guiding thread into said passageway;

(c) a generally cylindrical insert fixed in said barrel passageway and including a longitudinal channel therethrough having a diameter equal to or less than the diameter of said central guide orifice;

(d) a plurality of spaced, substantially inside wall of said longitudinal channel, said plurality of grooves surrounding the yarn path therethrough;
(e) an elongated ceramic rod partially embedded in each of said grooves and forming a plurality of peripherally spaced obstructions around the wall forming said longitudinal channel;
(f) whereby the yarn exiting said spinning rotor through said navel member intermittently engages said ceramic rods causing an improved roughening and bulking effect.

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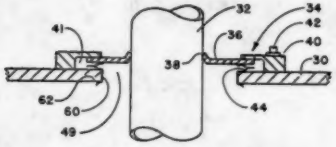
4,712,370

## SLIDING DUCT SEAL

Andrew MacGee, Cincinnati, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 24, 1986, Ser. No. 855,243
Int. Cl.[4] F02C 6/18; F02G 3/00
U.S. Cl. 60—39.07 3 Claims




1. An air seal for reducing air leakage associated with an accessory conduit penetrating an air duct wall of an aircraft engine, the air seal comprising:
(a) a sliding seal plate for encircling the accessory conduit;
(b) a retaining plate connected to the air duct for retaining said seal plate adjacent to the air duct wall; and
(c) an opposingly sprung seal member for forming an air seal between the air duct wall and said sliding seal plate, wherein said seal member is further characterized by two opposingly sprung seal legs, one of said seal legs being adjacent to said sliding seal plate and the other of said seal legs being adjacent to the air duct wall.

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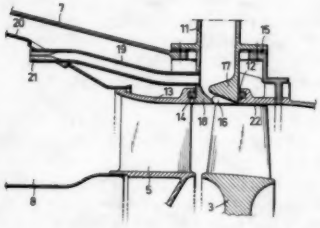
4,712,371

## PROCESS AND DEVICE FOR STARTING A GAS TURBINE

Thomas Weber, Oberursel, Fed. Rep. of Germany, assignor to Klöckner-Humboldt-Deutz AG, Cologne, Fed. Rep. of Germany

Filed Nov. 14, 1985, Ser. No. 797,903
Claims priority, application Fed. Rep. of Germany, Nov. 14, 1984, 3441509
Int. Cl.[4] F02C 7/27
U.S. Cl. 60—39.142 8 Claims




1. In a gas turbine which includes a compressor; a turbine that defines a central rotary axis; a plurality of combustion chambers which are annularly disposed around said turbine; an outer housing which encloses said compressor, said turbine and said combustion chambers; and an ignition means for starting said gas turbine; the improvement wherein said ignition means comprises a main hot exhaust gas supply channel which extends through said outer housing perpendicularly to said imaginary central axis, said main hot exhaust gas supply channel terminating within said outer housing at a discharge mouth which is directed towards said turbine so as to direct hot exhaust gases against said turbine and cause said turbine to rotate, and a plurality of branch hot exhaust gas supply channels within said outer housing which extend from said main fuel gas supply channel generally in parallel with said central rotary axis and respectively directly into said plurality of combustion chambers, each of said branch hot exhaust gas supply channels having a fan-shaped nozzle at its end within a respective combustion chamber for emitting a fan-shaped flow of exhaust gases into the respective combustion chamber to initiate combustion of fuel therein.

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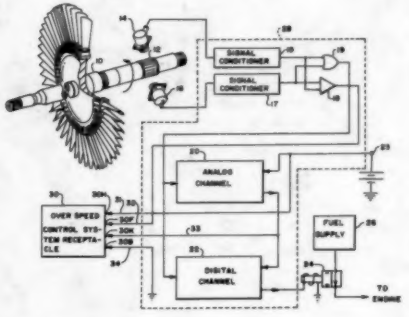
4,712,372

## OVERSPEED SYSTEM REDUNDANCY MONITOR

Thomas A. Dickey, Westport, and George R. Bodetka, Stamford, both of Conn., assignors to Avco Corporation, Stratford, Conn.

Filed Sep. 18, 1985, Ser. No. 777,118
Int. Cl.[4] F02C 9/00
U.S. Cl. 60—39.281 4 Claims




1. In an overspeed control system for a gas turbine engine including:
a power source; a speed sensing circuit consisting of at least two sensors operatively connected to the gas turbine engine to redundantly generate first signals proportional to the operational speed of said gas turbine engine; gating means connected to receive the first speed signals and transmit a second speed proportional thereto only if all of said redundant signals are present; means to generate a signal indicative of a predetermined overspeed condition; dual comparison circuits, each connected to receive the first speed signals and the predetermined overspeed condition signal, said dual comparison means connected in series to generate an overspeed signal when comparisons, by each of said circuits, of said predetermined signal to at least one of said first speed signals is each indicative of an engine overspeed condition, said dual comparison circuits generating internal signals indicative of proper operation of each of said circuits; and actuating means responsive to the overspeed signal to shut off the fuel supply to the gas turbine engine; a monitor for checking the proper functioning of the overspeed control system during normal operation of the gas turbine engine comprising:
first means connected to the overspeed control system to receive the second speed signal and generate a first monitor signal in response thereto;

speed sensing circuit indicating means connected to receive the first monitor signal and to provide a visual indication of the proper functioning of the speed sensing circuits;

second means connected to the overspeed control system to receive the internal signals of the dual comparison circuits to generate a second monitor signal in response thereto;

comparison circuit indicating means connected to receive the second monitor signal and to provide a visual indication of the proper functioning of the dual comparison circuits; and

self test circuitry connected to actuate the first and second monitor signal generating means independent of the overspeed control system to check the proper functioning of the monitor.

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**4,712,373**

## DOUBLE AIR-FUEL RATIO SENSOR SYSTEM HAVING IMPROVED RESPONSE CHARACTERISTICS

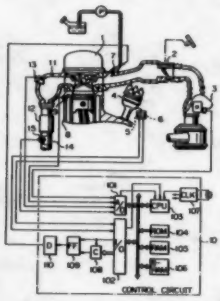
**Toshinari Nagai, Susono; Takatoshi Masui; Yasushi Satou, both of Mishima, and Toshiyasu Katsuno, Susono, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan**

**Filed Apr. 9, 1986, Ser. No. 849,839**

**Claims priority, application Japan, Apr. 12, 1985, 60-076615**

**Int. Cl.[4] F02D *41/14***

**U.S. Cl. 60—274** **16 Claims**




1. A method for controlling the air-fuel ratio in an internal combustion engine having a catalyst converter for removing pollutants in the exhaust gas thereof, and upstream-side and downstream-side air-fuel ratio sensors disposed upstream and downstream, respectively, of said catalyst converter for detecting a concentration of a specific component in an exhaust gas, comprising the steps of:

determining whether or not said engine satisfies first predetermined air-fuel ratio feedback control conditions;

compariing the output of said upstream-side air-fuel ratio sensor with a first predetermined reference voltage when said engine satisfies said first predetermined air-fuel ratio feedback control conditions;

changing a first air-fuel ratio correction amount in accordance with a result of the comparison of the output of said upstream-side air-fuel ratio sensor with said first predetermined reference voltage;

determining whether or not said engine satisfies second predetermined air-fuel ratio feedback control conditions;

comparing the output of said downstream-side air-fuel ratio sensor with a second predetermined reference voltage when said engine satisfies said second predetermined air-fuel ratio feedback control conditions;

changing a second air-fuel ratio correction amount in accordance with a result of the output of said downstream-eide air-fuel ratio sensor with said second predetermined reference voltage, the changing speed of said second air-fuel ratio correction amount being larger for a predetermined time period after said engine satisfies said second predetermined air-fuel ratio feedback control conditions than after said predetermined time period has passed; and

adjusting the actual air-fuel ratio in accordance with said first and second air-fuel ratio correction amounts.

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**4,712,374**

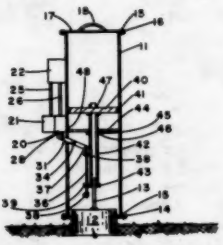
## HYDRAULIC PUMP JACK

**Wayne A. Stewart, 608 W. 10th, McCook, Nebr. 69001**

**Filed Aug. 10, 1981, Ser. No. 291,518**

**Int. Cl.[4] F16D *31/02*; F01L *31/00***

**U.S. Cl. 60—369** **1 Claim**



1. In combination,

a manhole type vault having upper and lower ends, said vault being situated in the ground with said upper end disposed approximately at ground level,

a cover removably covering the upper end of said vault,

an oil well casing disposed within the ground below said vault, said casing having an upper end portion protruding into said vault through the lower end thereof, and

a hydraulic pump jack, comprising

(a) hydraulic cylinder means mounted on the upper end of said oil well casing,

(b) piston means slidably mounted within said hydraulic cylinder means;

(c) piston rod means having a first end and a second end wherein said first end is operably attached to said piston and said second end is operably attached to the oil well sucker rod;

(d) fluid forcing means for providing hydraulic fluid under pressure to said cylinder means;

(e) control valve means for controlling the flow of hydraulic fluid to said hydraulic cylinder;

said piston rod means comprising a tubular shaft for telescopingly accepting said oil well sucker rod,

said hydraulic cylinder means comprising a rod end cap fixedly mounted within said hydraulic cylinder means whereby said hydraulic cylinder means is divided into an upper chamber and a lower chamber;

said piston rod means being slidingly mounted in said rod end cap and wherein said piston means is positioned in said upper chamber of said hydraulic cylinder means;

a hydraulic fluid return reservoir in fluid communication with said fluid forcing means and said control valve means; and

said hydraulic cylinder means comprising a removable blind end cap positioned at the top end of the cylinder.

4,712,375

## SAFETY DEVICE FOR PRIORITY HYDRAULIC CONSUMER

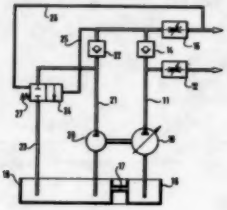
Wolfgang Kauss, Lohr-Wombach, and Norbert Mucheyer, Rechtenbach, both of Fed. Rep. of Germany, assignors to Mannesmann Rexroth GmbH, Fed. Rep. of Germany

Filed Apr. 8, 1986, Ser. No. 849,471

Claims priority, application Fed. Rep. of Germany, Apr. 18, 1985, 3513967

Int. Cl.[4] F16D *31/02*

U.S. Cl. 60—405 6 Claims



1. A safety device in a system having a priority consumer and a lower ranking consumer comprising a pump having a pressure line and a suction communicating with a source and an auxillary pump having a pressure line and a suction line communicating with a source, the improvement comprising means communicating said pump pressure line to said lower ranking consumer and to said priority consumer through a first check valve, means communicating said auxiliary pump pressure line with said priority consumer through a second check valve, and valve means responsive to the pressure applied to said priority consumer for communicating said auxiliary pump pressure line to its source when the pressure applied to said priority consumer is above a predetermined value and for closing the communication of said auxiliary pump pressure line to its source when the pressure applied to said priority consumer is less than said predetermined value.

4,712,376

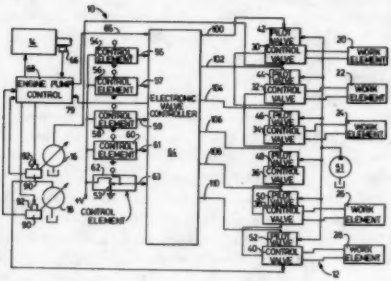
## PROPORTIONAL VALVE CONTROL APPARATUS FOR FLUID SYSTEMS

John M. Hadank, Dunlap, and Todd D. Creger, Peoria, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed Oct. 22, 1986, Ser. No. 921,506

Int. Cl.[4] F16D *31/02*

U.S. Cl. 60—427 20 Claims




1. An apparatus for controlling a fluid system of a work vehicle having a source of motive power, at least one fluid circuit having a variable displacement pump driven by the source of motive power, a plurality of control valves for controllably passing fluid from the variable displacement pump to a plurality of respective work elements, and a plurality of operator control elements, the apparatus comprising:

means for sensing the speed of said source of motive power and delivering a signal representative of the actual speed in response to said sensed speed;

means for providing demand signals in response to selected settings of each respective operator control element; and

an electronic valve controller for receiving the actual speed signal and the demand signals, determining available flow and requested flow capacities of said variable displacement pump in response to the respective actual speed and demand signals, comparing the requested flow to the available flow capacity, delivering output signals to the respective control valves in response to said comparison, selectively positioning the valves, and limiting the total requested fluid flow to said respective work elements within the available flow capacity of the variable displacement pump.

4,712,377

## CONTROL APPARATUS FOR HYDRAULIC MOTOR

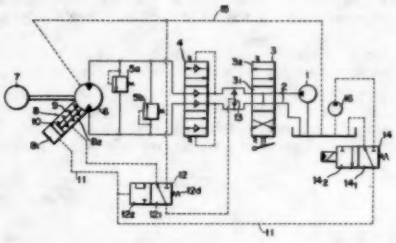
Toshiyuki Yoshida, Kawasaki, and Mitsuru Arai, Kamakura, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Sep. 13, 1985, Ser. No. 776,016

Claims priority, application Japan, Sep. 17, 1984, 59-139397[U]

Int. Cl.[4] F16D *31/02*

U.S. Cl. 60—444 3 Claims



1. A control apparatus for a hydraulic motor for use in a construction vehicle driven by hydraulic power, comprising:

(a) a hydraulic motor connected to the running gear of the vehicle;

(b) a hydraulic pump serving as a pressurized fluid supply source to supply hydraulic fluid into said hydraulic motor;

(c) a manually operable directional control valve connected across supply and discharge conduits which extend between said hydraulic motor and said pressurized fluid supply source;

(d) a brake valve means connected across said conduits which extend between said directional control valve and said hydraulic motor, said brake valve means including a counterbalancing valve and two relief valves, said counnterbalancing valve and said relief valves all being connected across said supply and discharge conduits which extend between said manually operable directional control valve and said hydraulic motor; and

(e) a selector valve adapted to control the supply of control pressurized fluid, which is introduced through a shuttle valve connected across said conduits, into a displacement control cylinder contained in said hydraulic motor, said selector valve being a pilot operated type selector valve which can be remotely controlled by pilot pressurized fluid supplied from an external pressurized fluid supply source through a pilot fluid conduit in which a remote controlled solenoid operated control valve is provided for selectively connecting said selector valve and a bottom side pressure chamber of said displacement control cylin-

der with said external pressurized fluid supply source and with a drain conduit.

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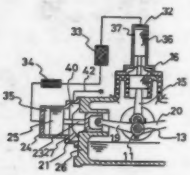
4,712,378

## DRIVING APPARATUS FOR STIRLING CYCLE ENGINE

Kouichi Nakayama, Kariya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Mar. 27, 1986, Ser. No. 844,936
Claims priority, application Japan, Mar. 29, 1985, 60-67637
Int. Cl.[4] F02G 1/04
U.S. Cl. 60—525 7 Claims



1. In a Stirling engine, a driving apparatus comprising:
at least two compression pistons;
a driving mechanims for each compression piston;
a rod interconnecting each compression piston with its respective driving mechanism;
a diaphragm on each rod closing off a space of the compression piston back pressure side and permitting a change in the volumetric capacity of the space, means for releasing pressure from the spaces of the compression piston back pressure sides; and
a crank axle having at least one crank pin, the at least two compression pistons being connected to a common one of said crank pins of said crank axle and located on opposite sides of said crank axle, said diaphragm of the two compression pistons changing the volumetric capacity of the piston back pressure sides 180° out of phase relative to one another.

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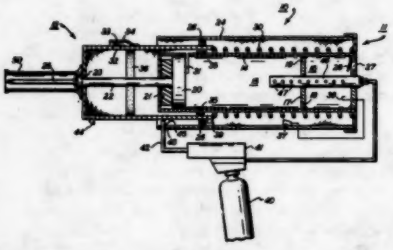
4,712,379

## MANUAL RECYCLER FOR DETONATING IMPACT TOOL

Joseph S. Adams, Whistler, and Paul G. Branston, Vancouver, both of Canada, assignors to Pow-R Tools Corporation, Vancouver, Canada

Filed Jan. 8, 1987, Ser. No. 1,622
Int. Cl.[4] F01B 29/08; F02N 13/00
U.S. Cl. 60—632 28 Claims



1. A detonating impact tool comprising:
a. a main housing having spaced inner and outer walls, with an inner wall enclosing a detonation chamber and an outer wall surrounding a space around said inner wall;
b. a front housing fitting between said inner and outer walls where a compression spring biases said front housing forward;
c. a piston axially movable within said detonation chamber and having an impact rod extending forward of said detonation chamber and said front housing;
d. an exhaust passageway for exhausting gases from said detonation chamber out through said front housing;
e. means for admitting air and fuel to said detonation chamber; and
f. said front housing, piston, and main housing being arranged so that pressing a fastener against a work piece with said tool to retract said piston and said front housing against said spring charges and then detonates a charge in said detonation chamber, driving said piston and said impact rod forward to drive said fastener into said work piece, and opening said exhaust passageway to initiate an exhaust.

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4,712,380

## UTILIZATION OF THERMAL ENERGY

Ian K. Smith, London, England, assignor to Solmecs Corporation N.V., Curacao, Netherlands Antilles

PCT No. PCT/EP85/00067, § 371 Date Sep. 24, 1985, § 102(e) Date Sep. 24, 1985, PCT Pub. No. WO85/03328, PCT Pub. Date Aug. 1, 1985
PCT Filed Jan. 23, 1985, Ser. No. 783,224
Claims priority, application United Kingdom, Jan. 25, 1984, 8401908
Int. Cl.[4] F01K 7/00
U.S. Cl. 60—641.2 9 Claims

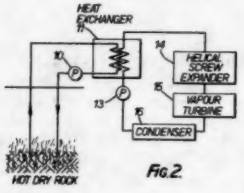



Fig.2

1. A method of utilizing thermal energy comprising the steps of
heating a first fluid by pumping through a hot dry rock heat source,
transferring the heat from the said first fluid to a more volatile, second fluid which passes through a trilateral cycle and recycling the first fluid to the heat source, the said trilateral cycle comprising
substantially adiabatically pressurizing the said second fluid,
receiving the transferred heat from the first working fluid,
substantially adiabatically expanding the hot pressurized second fluid by flashing in a helical screw expander capable of operating effectively with wet working fluid and
progressively drying said fluid during expansion,
passing substantially the whole of the exhaust dry second fluid through a turbine operating on dry vapor as in the conventional Rankine cycle,
condensing the second fluid exhausted from the turbine, and
recycling the second fluid to the adiabatic pressurization stage.

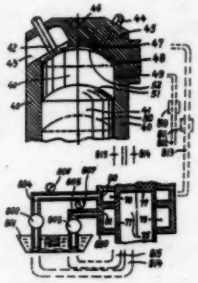
## 4,712,381
## FLUID HANDLING ELEMENTS AND COMBUSTION ENGINES

**Karl Eickmann, 2420 Isshiki, Hayama-machi, Kanagawa-ken, Japan**

**Continuation-in-part of Ser. No. 282,990, Jul. 14, 1981, Pat. No. 4,557,347, and a continuation-in-part of Ser. No. 338,741, Jan. 12, 1982, Pat. No. 4,480,532, and a continuation-in-part of Ser. No. 468,106, Feb. 22, 1983, abandoned, and a continuation-in-part of Ser. No. 529,254, Sep. 6, 1983. This application Oct. 29, 1984, Ser. No. 665,482**

**Int. Cl.[4] F01B *29/04***

**U.S. Cl. 60—712** **2 Claims**



1. A cylinder in a fluid handling device with high pressures and temperatures in said cylinder which variate in continuing cycles periodically,

wherein at least one outer chamber is mounted around the wall of said cylinder and provided with at least one entrance port in the housing of said outer chamber,

wherein a fluid under pressure is from a fluid pressure supply means (pump) led into that outer chamber parallel to said cycles in order to provide substantially reduced pressure differences between the inside and outside of said wall of said cylinder and in the ideal application to provide substantial equal pressures at said cycles inside and outside of said wall of said cylinder in order to prevent breaking of said cylinder under high internal pressures in said cylinder, and,

wherein an outgoing passage is provided on said outer chamber to transfer said fluid from said outer chamber into said cylinder.

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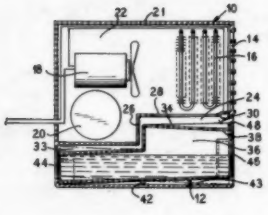
## 4,712,382
## DEHUMIDIFIER HAVING LOW PROFILE RECEPTACLE

**Douglas D. LeClear, St. Joseph Township, Berrien County, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.**

**Filed Oct. 20, 1986, Ser. No. 920,739**

**Int. Cl.[4] F25D *21/14***

**U.S. Cl. 62—150** **19 Claims**



1. A condensate receptacle for cooperation with an apparatus having operative components that discharge a liquid during operation and shutoff switch means for selectively energizing said operative components, the receptacle comprising:

a top portion including means for admitting condensate into a chamber defined by the receptacle;

pivoting means located on a bottom of the receptacle for allowing the receptacle to pivot from a first position to a second position when a predetermined amount of liquid is admitted into the chamber, in the first position a back end of the receptacle rests on a surface of the apparatus and a front end of the receptacle is elevated, in the second position the front end of the receptacle rests on the surface and the back end is elevated; and

the shut-off switch means is a biased-open shutoff switch having an actuator located superjacent a portion of a perimeter of the top portion of the receptacle, the shut-off switch is closed energizing the operative components by the perimeter of the top portion of the receptacle when the receptacle is in the first position and is opened deenergizing the operative components when the receptacle is in the second position or absent.

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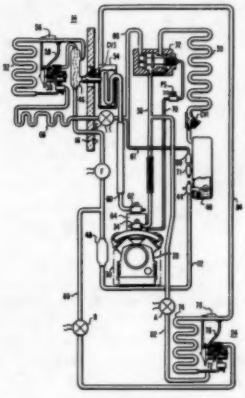
## 4,712,383
## COMPARTMENTALIZED TRANSPORT REFRIGERATION SYSTEM

**Leland L. Howland, Belle Plaine, and Jayaram Seshadri, Minneapolis, both of Minn., assignors to Thermo King Corporation, Minneapolis, Minn.**

**Division of Ser. No. 915,601, Oct. 6, 1986, Pat. No. 4,685,306. This application Apr. 9, 1987, Ser. No. 36,537**

**Int. Cl.[4] F25B *5/00***

**U.S. Cl. 62—200** **4 Claims**



1. A compartmentalized transport refrigeration system, comprising:

a trailer having a first compartment,

a host refrigeration unit for controlling the air temperature of said first compartment via heating, cooling, and null modes,

said host unit comprising a closed fluid circuit which includes a compressor, condenser, receiver, expansion valve, evaporator, and liquid, hot gas and suction lines,

first valve means connected in said closed fluid circuit to direct fluid flow from the high pressure side of said compressor to: (a) said condenser when said host unit is in a cooling mode, and (b) to said evaporator via a hot gas line which by-passes the expansion valve when said hot unit is in a heating mode,

second valve means for selectively enabling and blocking fluid flow through said host hot gas line,

third valve means for selectively enabling and blocking fluid flow through said host liquid line,

a second compartment in said trailer,

a remote unit for controlling the air temperature of said second compartment via heating, cooling, and null modes, said remote unit including an evaporator, and liquid, hot gas and suction lines connected to the liquid, hot gas, and suction lines of said host unit, respectively,

fourth and fifth valve means for respectively and selectively enabling and blocking fluid flow between said remote liquid and hot gas lines and said host unit,

and control means for selecting the heating mode of said first valve means, and the fluid blocking positions of said second and fourth valve means, when the fifth valve means connects the hot gas line of the host unit to the remote evaporator, to enhance the heating capability of the remote evaporator by directing the entire output of the compressor to the remote evaporator when the remote unit requires heat.

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**4,712,384**

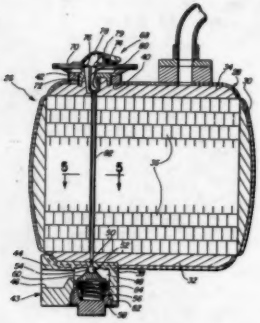
## INTEGRATED EVAPORATOR AND THERMAL EXPANSION VALVE ASSEMBLY

**Lawrence E. Crowe, Lindenwood, Ill., assignor to Sundstrand Corporation, Rockford, Ill.**

**Filed Sep. 22, 1986, Ser. No. 909,856**

**Int. Cl.[4] F25B *41/04***

**U.S. Cl. 62—225** **24 Claims**



1. In a refrigeration system, an integrated evaporator and thermal expansion valve assembly, comprising:

evaporator means including a housing surrounding a heat exchanger core means and defining inlet header means within the housing at one side thereof and outlet header means within the housing at another side thereof;

valve means mounted on the housing in communication with the inlet header means for controlling the flow of refrigerant to the evaporator of the refrigeration system;

pressure and temperature responsive means mounted on the housing with a sensing member directly in the outlet header means for responding to the superheat temperature in the outlet header means of the evaporator for opening the valve means when the superheat temperature increases and for responding to the pressure in the refrigeration system for closing the valve means when the pressure increases to offset a portion of the effect of the temperature responsive means on the valve means; and

coupling means extending through the heat exchanger core means between the inlet header means at said one side of the evaporator housing and the outlet header means at said other side of the housing for operatively interconnecting the pressure and temperature responsive means to the valve means to move the valve means as a function of said responses of the pressure and temperature responsive means.

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**4,712,385**

## REFRIGERATING UNIT FOR VENDING MACHINE

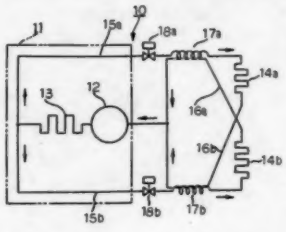
**Kazumi Aoki, Gunma, and Minoru Fujii, Omama, both of Japan, assignors to Sanden Corporation, Gunma, Japan**

**Filed May 29, 1986, Ser. No. 868,141**

**Claims priority, application Japan, May 31, 1985, 60-80809[U]**

**Int. Cl.[4] F25D *17/00***

**U.S. Cl. 62—333** **3 Claims**



1. A refrigerating unit for use in a vending machine comprising a condensing unit including a single compressor and a condenser, two parallel connected evaporators, each evaporator being disposed in an isolated chamber of the vending machine and each evaporator being connected with said condensing unit through a discharge line and a suction line to form two refrigerant circuits, and a decompression device inserted in the suction side portion of each evaporator, the improvement comprising said suction lines being connected between said compressor and said evaporators, and said evaporator of one refrigerant circuit having a portion of its discharge line passing closely adjacent in heat exchange relation with said decompression device on the other refrigerant circuit to maintain balance of the circulating amount of refrigerant in each of said refrigerant circuits.

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**4,712,386**

## DISCOID COLD CARTRIDGE INSERTABLE INTO AN ICE-CREAM MAKER

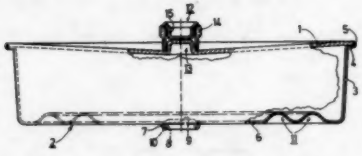
**Romuald L. Bukoschek; Merowech Eckel, both of Klagenfurt, Austria, and Johann Schröder, Aachen, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Jun. 23, 1986, Ser. No. 877,560**

**Claims priority, application Austria, Jun. 26, 1985, 1904/85**

**Int. Cl.[4] A23G *9/12***

**U.S. Cl. 62—342** **9 Claims**



1. A discoid cold cartridge insertable into an ice-cream maker and filled with a latent heat storage medium, comprising:

a first part including a discoid main wall facing a scraper and stirrer tool of said ice-cream maker, said wall being adapted to coact with said scraper and stirrer tool, said wall having an inherently stable, outwardly curved shape, whereby the formation of the air bubbles on the portion of said first part most effectively cooperating with said scraper and stirrer tool is substantially eliminated, and

a second part connected to said first part to form said cartridge, said second part including a trough-shaped base, said base having at least one flexible wall reversibly adaptable to the change in volume of the latent heat storage medium phase transition.

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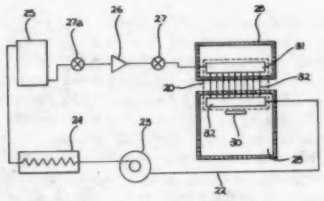
4,712,387

## COLD PLATE REFRIGERATION METHOD AND APPARATUS

Timothy W. James, 325 Ladera #7, Santa Barbara, Calif. 93101, and David Wyman, 4727 Calle Reina, Santa Barbara, Calif. 93110

Filed Apr. 3, 1987, Ser. No. 34,397
Int. Cl.[4] F25D 3/00
U.S. Cl. 62—434 17 Claims




1. A refrigeration system for cooling substances to below ambient temperatures, said refrigeration system comprising:

a first insulated, enclosure means containing cold storage means capable of absorbing and emitting heat while remaining at a substantially constant temperature;

a tube assembly means comprising an upper heat exchanger means, a lower heat exchanger means, and a plurality of substantially vertical conduit means connecting said upper heat exchanger means with said lower heat exchanger means, said upper heat exchanger means being in thermal communication with said cold storage means and said lower heat exchanger means being in thermal communication with said substances to be cooled below ambient temperatures;

a refrigerant processing means, said refrigerant processing means comprising a compressor means, a condenser means, a refrigerant reservoir means and expansion valve means, each having an inlet and an outlet; said refrigerant processing means further comprising conduit means for connecting said outlet of said tube assembly means to said inlet of said compressor means, said outlet of said compressor means to said inlet of said condenser means, said outlet of said condenser means to said inlet of said reservoir means, said outlet of said reservoir means to said inlet of said expansion valve means and said outlet of said expansion valve means to said inlet of said tube assembly means, thereby forming a closed refrigerant loop;

a volume of a refrigerant contained within said refrigerant loop; and

an inlet valve means located in said conduit means between said inlet of said tube assembly and said outlet of said reservoir;

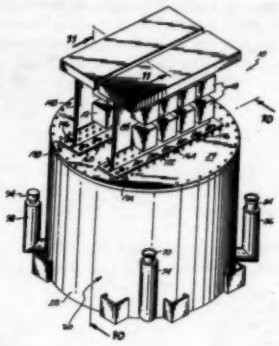
whereby through selective operation of said compressor means and said inlet valve means said refrigeration system is capable of powered and non-powered cooling of said substances below ambient temperatures.

4,712,388

## CRYOSTAT COOLING SYSTEM

Daniel C. Sullivan, Columbia Heights, and Earl A. Mazorol, Jr., Bloomington, both of Minn., assignors to ETA Systems, Inc., St. Paul, Minn.

Filed Jan. 7, 1987, Ser. No. 1,236
Int. Cl.[4] F25B 19/00
U.S. Cl. 62—514 R 27 Claims



1. A cryostat comprising:

an outer shell having a side wall and a closed bottom;

an inner shell positioned within the outer shell, the inner shell having a side wall, a closed botton and an open top;

means for connecting the inner and outer shells to define a vacuum chamber therebetween;

an inner shell top plate covering the open top end of the inner shell, the inner shell top plate having a first opening therein;

a first containment vessel mounted below the inner shell top plate and within an interior of the inner shell for receiving a first device to be cooled;

supply means connected to the first containment vessel for supplying liquid cryogenic coolant to the first containment vessel; and

means for suspending the device in the first containment vessel while covering the first opening and while providing transmission of signals to and from the first device.

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4,712,389

## FLOWER HOLDER JEWELRY ARTICLE

Pamela B. Innis, 2733 St. Laurent Pl., La Jolla, Calif. 92037

Filed Oct. 20, 1986, Ser. No. 920,447
Int. Cl.[4] A44C 1/00, 15/00
U.S. Cl. 63—1 R 7 Claims

1. An item of jewelry adapted to hold a fresh cut flower in water, said jewelry item comprising;

a substantially rigid cylindrical member made of jewelry material;

means for securing said cylindrical member to a person to show it off as jewelry;

an elongated vial having a closed bottom end and an open top end; and

resilient stopper means closing said top end of said vial, said stopper means having an opening therethrough which is substantially smaller than the opening of the top of said vial;

said vial being removably retained within said cylindrical member by means of said stopper means frictionally engaging the interior surface of said cylindrical member;

said vial being adapted to hold water and a portion of the stem of a cut flower extending through said opening in said stopper means so that the flower bud or blossom extends from said cylindrical member.

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**4,712,390**

## CIRCULAR KNITTING MACHINE INCORPORATING A STITCH DENSITY ADJUSTER DEVICE

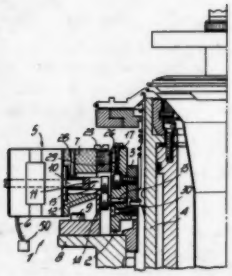
**Francesco Lonati, Brescia, Italy, assignor to Lonati SpA, Brescia, Italy**

**Filed Dec. 5, 1985, Ser. No. 805,009**

**Claims priority, application Italy, Dec. 10, 1984, 23969 A/84**

**Int. Cl.[4] D04B *15/32***

**U.S. Cl. 66—54** **5 Claims**



1. In a circular knitting machine including a supporting structure, a needle cylinder having an axis of rotation, cam assemblies near said needle cylinder, said needle cylinder rotating about said axis of rotation thereof and relative to said cam assemblies, said cam assemblies including stitch cam means adjustably movable in a direction substantially parallel to the axis of rotation of said needle cylinder,

a stitch density adjusting device comprising a framework arranged in front of said stitch cam means at a radial distance therefrom with respect to said needle cylinder to leave an interspace therebetween, said framework being supported by said supporting structure, supported on said framework a step motor having a shaft, within said interspace transmission means transmitting adjusting motion from said step motor shaft to said stitch cam means to impart to said stitch cam means a preset displacement relative to said cam assemblies and an electronic machine control connected with said step motor for controlling the operation thereof,

said transmission means comprising drive cam means connected to said step motor shaft, cam follower means in transmissive engagement with said drive cam means, a slide arranged near said stitch cam means, connection means for connecting said slide with said stitch cam means, guide means for guiding said slide in a direction parallel to the axis of rotation of said needle cylinder, said cam follower means being secured to said slide to transmit to said slide the motion received from said drive cam means, wherein said drive cam means comprise a cam shaft extending perpendicular to said needle cylinder axis of rotation and having a detent dog fixed thereon, said detent dog defining a circular path thereof following rotation of said cam shaft, and wherein said framework comprises a pin formation secured thereon and extending into said circular path of said detent dog to determine a limit stop for resetting the rotation of said drive cam at the start of each knitting cycle.

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**4,712,391**

## FLAT KNITTING MACHINE

**Reinhold Schimko, Aalen-Wasseralfingen, Fed. Rep. of Germany, assignor to Universal Maschinenfabrik Dr. Rudolf Schieber GmbH & Co. KG, Fed. Rep. of Germany**

**Filed Apr. 16, 1987, Ser. No. 39,133**

**Claims priority, application Fed. Rep. of Germany, Apr. 16, 1986, 3612836**

**Int. Cl.[4] D04B *15/00***

**U.S. Cl. 66—115** **9 Claims**

1. Flat knitting machine having a needle bed and comprising: a needle selection arrangement movable along said needle bed, knitting needles arranged in channels of the needle bed, and selector drivers or a tandem arrangement of working drivers and selector drivers positioned adjacent the knitting needles in the needle channels to cooperate with the needle selection arrangement, wherein the width of the working driver and/or selector driver is smaller than the width of the needle channels, and distance plates are inserted in the needle channels and fixed on at least one side of the drivers and extend substantially along the length of the working drivers and/or selector drivers and have a width equal to the difference between the width of the needle channels and the width of the working drivers and/or selector drivers.

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**4,712,392**

## DRY CLEANING APPARATUS

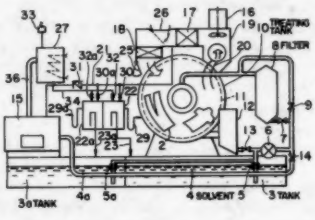
**Haruo Hagiwara; Hideo Tsukamoto, and Yasuhiro Tsubaki, all of Nagoya, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 27, 1985, Ser. No. 813,698**

**Claims priority, application Japan, Dec. 28, 1984, 59-277497; Dec. 28, 1984, 59-277498**

**Int. Cl.[4] D06F *43/08***

**U.S. Cl. 68—18 C** **1 Claim**




1. A dry cleaning apparatus in which a main portion of a dry cleaner comprises tanks for exclusively receiving at least two kinds of solvents which are soluble in each other, one treating tank connected to the tanks, a fractionating device, connected to the tanks and the treating tank, for recovering the two or more kinds of solvents by batch distillation, exclusive filters for the respective solvents comprising a common filter or a multi-filter device composed of both the filters which is disposed

between the tanks and the treating tank, and the two or more kinds of solvents are used independently so that washing is carried out.

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**4,712,393**

## METHOD AND DEVICE FOR PERMANENTLY LOCKING A MOVABLE MEMBER IN A FRAMEWORK

**Daniel Deschamps, Montigny Le Breton-Neux, and René Puntous, Toulouse, both of France, assignors to Fichet Bauche and Davey Bickford Smith & Cie.**

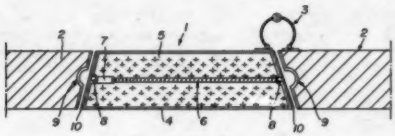
**PCT No. PCT/FR85/00129, § 371 Date Jan. 16, 1986, § 102(e) Date Jan. 16, 1986, PCT Pub. No. WO85/05651, PCT Pub. Date Dec. 19, 1985**

**FCT Filed May 24, 1985, Ser. No. 829,137**

**Claims priority, application France, May 25, 1984, 8408272; Jul. 12, 1984, 8411115**

**Int. Cl.[4] E05G *1/04*; E05B *63/00***

**U.S. Cl. 70—1.5** **17 Claims**



**1.** A safe, comprising

a door having front and back panels and a side edge surface extending between said front and back panels in a thickness direction of said door, and

a framework upon which said dooor is movably mounted, with said side edge surface being contiguous with said framework when said door is closed, and

explosive means situated within said door between said front and back panels thereof and adjacent said side edge surface, for exploding under the effect of an attack and for deforming said side edge surface adjacent thereto, to create therein at least one artificial bolt extending towards and into said framework.

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**4,712,394**

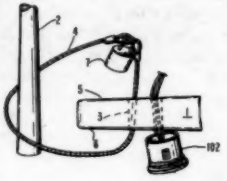
## SURF LOCK

**David R. Bull, 226 4th St., Hermosa Beach, Calif. 90254**

**Filed Oct. 28, 1986, Ser. No. 924,017**

**Int. Cl.[4] E05B *73/00***

**U.S. Cl. 70—18** **23 Claims**



**1.** Arrangement for securing a long, broad object having an upper surface spaced apart from a lower surface, to a fixed object comprising:

lockably connecting means;

a sleeve having outside walls, defining a preselected cross section, a first end and a second end, said sleeve axially mountable perpendicular to said long, broad surfaces under the condition of said first end being adjacent to said lower surface and said second end being adjacent said upper surface of said long, broad object, said sleeve including a first wall defining an orifice internal to said sleeve and extending from said first end to said second end having a preselected cross-section to provide an axial passage way for said lockably connecting means through said long, broad object to connect said long, broad object to said fixed object; and

a plug of a preselected length and including a bottom portion having a cross-sectional shape which complements but is slightly smaller than said orifice and axially insertably, removable through said orifice into said sleeve at least to a position in which said bottom portion is substantially adjacent to said first end under the condition that the end of said plug opposite said bottom portion is substantially adjacent to said second end.

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**4,712,395**

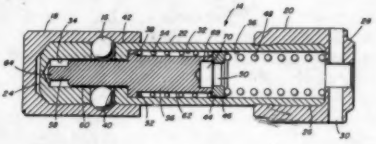
## BARREL LOCK WITH DETERRENT RING AND KEY THEREFOR

**Anthony J. Agbay, Auburn, Mass., assignor to OMCO, Inc., Holden, Mass.**

**Continuation of Ser. No. 842,074, Mar. 19, 1986, abandoned, which is a continuation of Ser. No. 595,434, Mar. 30, 1984, abandoned. This application Dec. 23, 1986, Ser. No. 945,232**

**Int. Cl.[4] E05B *67/36***

**U.S. Cl. 70—34** **8 Claims**



**1.** A barrel lock and key therefor comprising:

(a) a barrel lock having a hollow cylindrical lock barrel having a closed front end and an apertured rear end, said lock barrel having a stepped axially extending bore, a front bore of said stepped bore having a relatively small diameter and a rear bore of said stepped bore having a relatively large diameter;

(b) said stepped barrel bore having an annular shoulder forming the junction between said front bore and said rear bore;

(c) at least two radially extending passageways running from an outer aperture in the exterior surface of said lock barrel to an inner aperture in said front bore of said lock barrel, and a locking member mounted in each said passageway for limited movement therein, said locking member restrained from completely escaping through said outer aperture;

(d) a cylindrical plunger having a stepped axially extending exterior surface sized and shaped to slidably fit and reciprocate within said stepped bore of said lock barrel, the forward movement of said plunger being limited by said lock barrel annular shoulder, said plunger having a front exterior portion which is sized and shaped to permit said locking members to move radially inward, said plunger having a middle exterior portion which is sized and shaped to prevent said locking members from moving radially inward, said plunger in its rearward position opening the inner aperture of each said passageway and permitting each said locking member to move radially inward to its unlocking position, said plunger in its forward positioin closing the inner aperture of each said passageway forcing each said locking member outwardly to its locking position;

(e) said cylindricel plunger having an open rear end and an axially extending circular blind bore, the interior surface of said blind bore defining a cylindrical gripping surface;

(f) deterrent means for preventing picking of said barrel lock, said deterrent means having a washer-shape which has uniform circular walls forming a central completely circular opening, said deterrent means being positioned

within said rear bore of said lock barrel against said rear end of said plunger, the diameter of said completely circular central opening being uniform and being always smaller than the diameter of the cylindrical gripping surface of said circular plunger blind bore;

(g) a top compression spring positioned in said rear bore of said lock barrel, one end of said top compression spring bearing against the rear end of said deterrent means and urging said deterrent means against said plunger;

(h) a bottom compression spring positioned in said rear bore, said bottom compression spring bearing against the forward end of said deterrent means and against said plunger, said bottom compression spring urging said plunger forwardly;

(i) a key adapted to be inserted into said barrel lock and passed through said central circular opening in said deterrent means, said key having a hollow cylindrical key barrel having an apertured front end and an apertured rear end;

(j) a plurality of elongated relatively small diameter outer expanding fingers extending longitudinally forward through said key barrel apertured front end, said outer expanding fingers being fixed at their rear portios to a bushing which is axially movable within said key barrel and which is urged towards said front end of said key barrel, said outer expanding fingers having radially spreadable relatively large diameter gripping surface engaging finger tips;

(k) a key plunger extending longitudinally and rearwardly through said key barrel apertured rear end, said key plunger being axially movable within said key barrel, said key plunger positioned to the rear of said expanding fingers bushing;

(l) a cylindrical expander rod having an enlarged forward head, said expander rod telescopically slidable within said expanding fingers, the length of said expander rod being greater than the length of said expanding fingers, the rear end of said expander rod being fixed to said key plunger; and

(m) a key handle pivoted to the rear end of said key plunger, said key handle being manually pivotable to axially reciprocate said key plunger between a forward locked position in which said expander rod head is positioned forward of said expanding finger tips and said expanding finger tips are unspread and have a maximum diameter which is smaller than the uniform diameter of said deterrent means central circular opening, and a rearward unlocked position in which said expander rod is retracted to initially spread said relatively large diameter expanding finger tips to have a maximum diameter which is larger than the uniform diameter of said deterrent means central circular opening, and into firm engagement with said plunger blind bore gripping surface, while maintaining said relatively small diameter outer expanding fingers out of engagement with said deterrent means circular opening walls, and to subsequently pull said fully spread expanding finger tips and said plunger rearwardly permitting said locking members to move to their unlocking positions.

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**4,712,396**

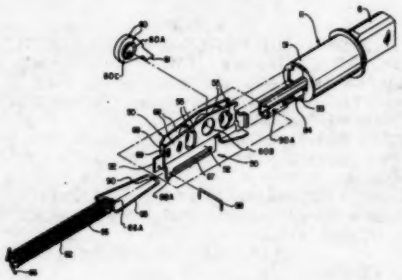
## EASY TO LOCK DEADBOLT STRUCTURE

**Arthur P. Cary, 2519 Farrington St., Dallas, Tex. 75207, and Leslie W. Lyons, 4215 W. Jefferson St., Dallas, Tex. 75211**

**Filed Oct. 6, 1986, Ser. No. 915,658**
**Int. Cl.[4] E05B *17/00***
**U.S. Cl. 70—129** **12 Claims**

1. In a lock system including a deadbolt and key and lever means to unlock said system, the improvements comprising:

a. means operable in response to movement of said lever means to hold said deadbolt in an unlocked position, and



b. release means operable apart from said key and lever means to cause said deadbolt to move to a locked position.

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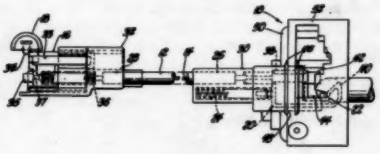
**4,712,397**

## PARKLOCK CONTROL

**Don L. Niskanen, Livonia, Mich., assignor to Teleflex Incorporated, Limerick, Pa.**

**Filed Mar. 6, 1987, Ser. No. 22,649**
**Int. Cl.[4] E05B *65/12***
**U.S. Cl. 70—248** **11 Claims**



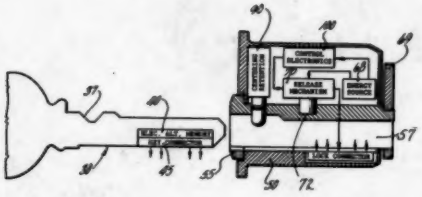
1. A park lock assembly (10) for retaining an automobile gear selector lever (22) in the park position while the automobile key lock means (18) is in the off position and for allowing the gear selector lever (22) to move out of the park position while the key lock means (18) is in the on position, said assembly (10) comprising; a conduit (12), a flexible motion transmitting core element (14) having first and second ends supported for longitudinal movement in said conduit (12), holding means (16) slideably disposed on said first end (35) of said core element (14) for engaging the key lock means (18) for being retained in an off position when the very lock means (18) is in said off position and movable past the key lock means (18) when the latter is in the on position, first biasing means (36) urging said holding means (16) into engagement with the key lock means (18) in the off position and into engagement with said first end (35) of said core element (14) in the on position, terminal means (20) attached to said second end (42) of said core element (14) for preventing movement of the selector lever (22) when the key lock means (18) is in the off position, said assembly characterized by including second biasing means (24) urging said core element (14) and said terminal means (20) out of and away from said second end of said conduit (12), said first biasing means (36) providing a greater force than said second biasing means (24), said terminal means (20) is urged to the extreme extended position by said second biasing means (24) and whereupon said first biasing means (36) moves said holding means (16) to the on position while retracting said terminal means (20) and overpowering said second biasing means (24).

4,712,398

## ELECTRONIC LOCKING SYSTEM AND KEY THEREFOR

Bruce A. Clarkson, Beverly; Ronald J. Frere, Southampton, both of Mass.; Thomas G. Loughlin, Rocky Hill, Conn.; William W. Taylor, Jr., Golden, Colo., and Peter Mongeau, Needham, Mass., assignors to Emhart Industries, Inc., Farmington, Conn.

Filed Mar. 21, 1986, Ser. No. 842,684
Int. Cl.[4] E05B 47/06
U.S. Cl. 70—276 16 Claims



1. A locking apparatus comprising:
a housing,
a mechanical member supported adjacent to said housing and movable relative thereto during operation of said locking apparatus,
a locking member movable into engagement with said mechanical member to prevent the movement of said mechanical member and the operation of said locking apparatus and moveable out of engagement with said mechanical member to allow the movement of said mechanical member and the operation of said locking apparatus,
a magnet supported within said housing,
an electrical coil supported for movement within the field of said magnet,
a first spring mechanically coupled to said coil for movement therewith between two stable positions of said first spring, and
a second spring coupled to said first spring for movement therewith and coupled to said locking member to move said locking member into and out of engagement with said mechanical member as said first spring moves between its two stable positions.

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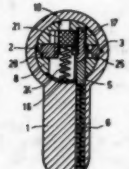
4,712,399

## CYLINDER LOCK WITH INTERCHANGEABLE KEY

Maria Mattossovich, Antrodoco, Italy, assignor to Rielda Serrature S.R.L., Roma Fiumicino, Italy

Filed Nov. 21, 1986, Ser. No. 933,540
Claims priority, application Italy, Dec. 19, 1985, 68073 A/85
Int. Cl.[4] E05B 27/04
U.S. Cl. 70—364 A 8 Claims



1. A cylinder lock with interchangeable key, comprising: a stator, in said stator a cavity, at least a longitudinal groove, and a series of seatings extending at least at one side of said cavity; a rotary cylinder mounted in said cavity of the stator, in said cylinder a slit suitable for receiving a key, a series of first seatings which intersect said key receiving slit, a series of second seatings extending parallel to said first seatings, and a first and a second slit extending orthogonally to said seatings of the cylinder and parallel to the axis of the cylinder; a series of sliders inserted with longitudinal and transversal mobility into said first seatings of the cylinder in order to cooperate with the notches of a key inserted into said key receiving slit, each slider having on one side a number of projections and, on the opposite side, a member for sliding engagement, and having an associated spring; a series of tumblers conforming at least at one of their ends to the outline of the cylinder, slidingly inserted into said second seatings of the cylinder, corresponding to said seatings of the stator and having a series of first recesses turned towards said projections of the sliders and at least one second recess turned towards the side opposite said sliders; a stop bar, inserted into said first orthogonal slit of the cylinder, having a number of projections turned towards said second recess of the tumblers and a continuous projection turned towards the opposite side and suitable for cooperating with said groove of the stator; and a translation bar, inserted into said second orthogonal slit of the cylinder, having a number of members for sliding engagement suitable for engaging said members for sliding engagement of the sliders, and a continuous projection turned towards the opposite side and suitable for cooperating with said groove of the stator; said components being coordinated in such a manner that said projections of the stop bar engage said second recesses of the tumblers when the continuous projection of the stop bar does not register with said groove of the stator, and disengage therefrom when said groove allows the stop bar to move towards the outside, whilst said sliders engage corresponding recesses of the tumblers when the continuous projection of the translation bar does not register with said groove of the stator, and disengage therefrom when said groove allows the translation bar to move towards the outside, thereby displacing all the sliders under the action of the respective sliding engagements without the possibility of the sliders tilting; whereby said translation bar, when it attains a position in which it registers with said groove of the stator, moves towards the outside by displacing the sliders, thus disengaging these latter from the tumblers and allowing, in such position, the substitution of the key with the consequent different codification of the lock.

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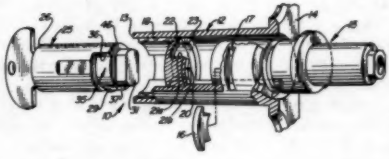
4,712,400

## REMOVABLE CYLINDER LOCK

Robert Steinbach, Glendale Heights, Ill., assignor to Chicago Lock Company, Chicago, Ill.

Continuation-in-part of Ser. No. 491,374, May 4, 1983. This application Apr. 13, 1987, Ser. No. 37,736
Int. Cl.[4] E05B 29/04
U.S. Cl. 70—369 6 Claims



1. In a rotatable cylinder lock of the type formed by an elongated cylindrical housing including an outer end and an inner end, a removable lock core adapted for removable engagement within said cylindrical housing and carrying a plurality of lock tumblers and a release tumbler along the length thereof, the lock tumblers being actuated by a bitted key for effecting the rotation of the lock core between the locked and unlocked positions thereof respectively, and the release tumbler being actuated by a release key for effecting the release and removal of the lock core from the cylindrical housing when the lock core is in the unlocked position, the improvement comprising in combination:

the cylindrical housing provided with a tumbler block mounted therein and extending inwardly for a distance.

a tumbler ledge formed in said cylindrical housing and extending inwardly for a distance, and extending circumferentially around a portion of the interior periphery of said cylindrical housing.

said tumbler ledge forming a shoulder for providing a riding surface for the release tumbler to ride on as the care is rotated

said lock core provided with a block restrictor relief section formed therein along the inner end thereof,

said block restrictor relief section constructed and positioned to accommodate the positioning of said tumbler block therein when said lock core is fully positioned within said cylindrical housing,

and the release tumbler positioned to be retractable into said block restrictor relief section when actuated into a release position by the release key, and into overriding relation with said shoulder formed by said tumbler ledge and in blocking relation with respect to said tumbler block to prevent removal of said lock core

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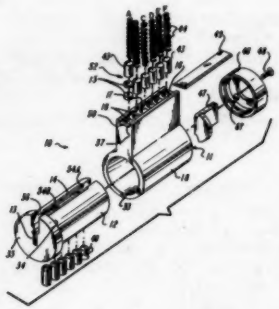
**4,712,401**

## RANDOMLY AND INTEGRALLY RE-KEYABLE LOCK APPARATUS AND METHOD

**Brian J. Monahan, 28895 Cragmont Dr., Evergreen, Colo. 80439**

**Filed Jul. 20, 1986, Ser. No. 881,227**
**Int. Cl.[4] E05B 25/00**
**U.S. Cl. 70—382** **27 Claims**



1. In a lock including a housing; a bore extending through said housing parallel to an axis; a plug having a cylindrical surface and being received in said bore; said bore of said housing and said cylindrical surface of said plug defining a shear interface, said housing and said plug having aligned holes therein forming portions of and combining to form a plurality of pinways that are spaced in the direction of said axis and that are divided by said shear interface; said plug being rotatably received in said bore; a first tumbler stack including a first tumbler pin, a first driver pin and at least one master pin being received in said first pinway; said master pin separating said first driver pin from said first tumbler pin; a second tumbler stack in said second pinway and including a second driver pin and a second tumbler pin; and a keyway formed in said plug and extending from said holes in said plug to said cylindrical surface of said plug; the improvement comprising:

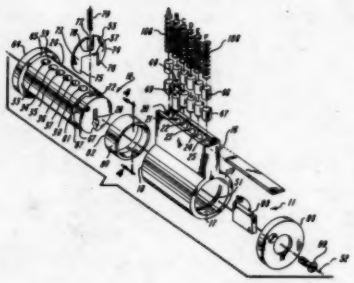
means formed in said surface of said plug adjacent said keyway for guiding a master pin from one of said pinways to another of said pinways, said guiding means having spaced shoulder means for preventing removal of said master pin from said lock.

**4,712,402**

## INTEGRALLY AND SEQUENTIALLY RE-KEYABLE LOCK APPARATUS AND METHOD

**Brian J. Monahan, 28895 Cragmont Dr., Evergreen, Colo. 80439**

**Filed Jun. 16, 1986, Ser. No. 874,993**
**Int. Cl.[4] E05B 25/00**
**U.S. Cl. 70—383** **27 Claims**



1. In a lock for sequential exclusive use with first and second change keys and use with reset key means for re-keying said lock to render it usable with only one of said change keys, said lock including a housing having an inner end; a bore extending through said housing along a longitudinal axis to define a shear interface; a plug rotatably received in said bore and having a keyway extending therein along said axis; said housing and said plug having holes therein, said housing and said plug being normally positioned so that said holes form portions of and combine to form at least first and second pinways that are spaced in the axial direction; a first tumbler stack including a first tumbler pin, a first driver pin and at least one master pin being received in said first pinway; said master pin separating said first driver pin from said first tumbler pin; and a second tumbler stack in said second pinway and including a second driver pin and a second tumbler pin; the improvement comprising:

said plug being slidably received in said bore for movement from said normal axial position in which said holes form said first and second pinways to a temporary re-keying axial position in which a hole in said plug that normally forms said second pinway is axially displaced for alignment with a hole in said housing that normally forms said first pinway so that said master pin is transferrable into a different one of said pinways;

means rotatable in said bore with said plug and slidably mounted on said plug for releasably retaining said plug in said normal axial position, said retaining means having a central section intersecting said keyway, said retaining means having a retainer section extending from said central section transversely across said inner end of said housing for retaining said plug in said normal axial position, said central section being adapted to respond to said reset key means in said keyway to move said retainer section into said bore and release said plug for movement to said temporary re-keying axial position; and

said bore having an arcuate slot formed therein transversely to said axial direction for receiving said retainer section of said retaining means to releasably retain said plug in said temporary re-keying axial position, said slot being formed eccentrically with respect to said arcuate section so that upon rotation of said plug said retainer section rides out of said slot to release said plug for return axial movement in said bore to said normal axial position and to allow said retainer section to extend transversely across said inner end of said housing for retaining said plug in said normal axial position, said return axial movement of said plug to said normal position being effective to recombine said holes and render said lock usable with only one of said

first and second change keys according to the different pinway in which said master pin is received.

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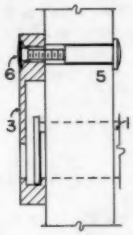
**4,712,403**

## METHOD OF PROTECTING LOCK CYLINDERS FROM BEING WRENCHED OR PULLED

**Frank Markisello, 91-10 Liberty Ave., Ozone Park, N.Y. 11417**

**Filed May 6, 1987, Ser. No. 46,572**
**Int. Cl.[4] E05B *15/02***
**U.S. Cl. 70—417** **4 Claims**




1. An interlocking plate for securing lock cylinders against forceable removal or forceable entry, said plate having a front side and a back side and a cylinder engaging end and a securing end, comprising:

an elongated opeing in said back of said plate at said cylinder engaging end, said elongated opening have a lock insertion portion with a dimension sufficient to accommodate insertion of the face of a lock cylinder, said elongated opening further including an interlocking portion having a cylinder face engaging lip for sliding receipt of the face of said cylinder therebehind whereby said cylinder engaging end is secured to said lock cylinder;

means for securing said plate at said securing end; and

cylinder face aperture in said front side located opposite elongated opening for access to said cylinder face when said device is mounted on said lock cylinder.

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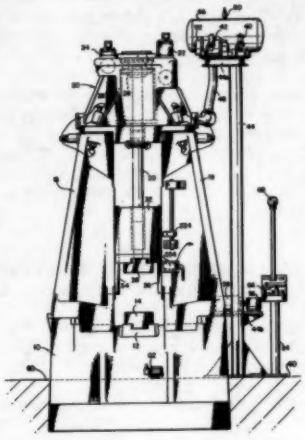
**4,712,404**

## METHOD OF SELF-REGULATING CONSISTENCY OF APPLIED ENERGY IN A FORGING HAMMER EMPLOYING INPUT DIFFERENTIAL

**Charles J. Crout; Charles W. Frame, both of Chambersburg, and Ronald N. Harris, Ft. Loudon, all of Pa., assignors to Chambersburg Engineering Company, Chambersburg, Pa.**

**Division of Ser. No. 695,697, Jan. 28, 1985, Pat. No. 4,653,300.**
**This application Jan. 5, 1987, Ser. No. 577**
**Int. Cl.[4] B21J *9/16***
**U.S. Cl. 72—8** **2 Claims**

1. The method of using multiple data relating to energy to maintain kinetic output at a preselected level to obtain a preselected kinetic energy at the time of impact of a ram of a forging hammer in a system employing an impact device having a frame supporting at least one cylinder, a piston within said cylinder, means connecting the piston to a ram assembly such that the ram is repeatedly movable relative to the frame from a retracted position into impact position, a driving compressible fluid system including a fluid supply, valve means connecting said fluid supply into said at least one cylinder at a position in the cylinder to drive the ram into impact position and permitting release of fluid from the cylinder, and a trapped volume of compressible lifting fluid causing the ram to be retracted from impact position when fluid driving the ram into impact is released from the cylinder, wherein there is provided pressure sensing means to sense the pressure of the lifting fluid, calculating means for calculating kinetic energy, comparator means for comparing kinetic energy with a standard and a counter for accumulating error, comprising: sensing the pressure of the lifting fluid to determine the rate of change of lifting fluid pressure and corresponding velocity of the ram assembly, calculating from the velocity and the mass of the ram assembly the kinetic energy, comparing the calculated kinetic energy



with a preselected kinetic energy requirement input, and, if there is significant error, correcting the timing of the valve means in the direction to correct or minimize the error.

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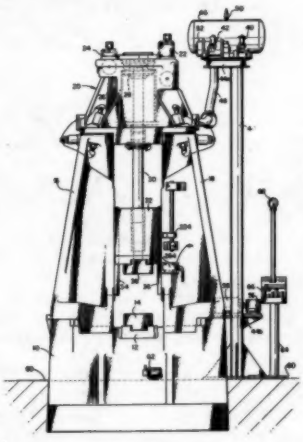
**4,712,405**

## METHOD OF SELF-REGULATION OF OUTPUT ENERGY OF FORGING HAMMERS USING INPUT SENSED PEAK OF LIFTING FLUID PRESSURE FOR CORRECTION

**Charles J. Crout; Charles W. Frame, both of Chambersburg, and Ronald N. Harris, Ft. Loudon, all of Pa., assignors to Chambersburg Engineering Company, Chambersburg, Pa.**

**Division of Ser. No. 695,697, Jan. 28, 1985, Pat. No. 4,653,300.**
**This application Jan. 5, 1987, Ser. No. 573**
**Int. Cl.[4] B21T *9/16***
**U.S. Cl. 72—19** **1 Claim**



1. The method of correcting effective kinetic energy to obtain the output kinetic energy at a preselected level in a system employing an impact device having a frame supporting at least one cylinder, a piston within said cylinder, means connecting the piston to a ram such that the ram is repeatedly

movable relative to the frame from a retracted position into impact position, a driving fluid system including a compressible fluid supply, valve means connecting said compressible fluid supply into said at least one cylinder at a position in the cylinder to drive the ram into impact position and permitting release of fluid from the cylinder, a trapped volume of compressible lifting fluid beneath the piston causing the ram to be retracted from impact position when fluid driving the ram into impact is released from the cylinder, and a pressure sensing means to sense the pressure of the lifting fluid comprising: sensing peak lifting air pressure, comparing said peak value with a reference pressure, representative of desired impact energy and, if it is in error, providing an incrementing or decrementing signal to correct the valve means to adjust the effect of the next blow.

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**4,712,406**

## APPARATUS FOR BENDING TUBULAR WORKPIECES

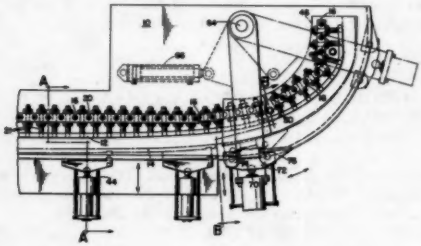
**Theodor Molz, Chur, Switzerland, assignor to W. Eckold AG, Switzerland**

**Continuation-in-part of Ser. No. 836,205, Feb. 27, 1986, abandoned, which is a continuation of Ser. No. 585,132, Mar. 1, 1984, abandoned. This application May 21, 1986, Ser. No. 865,899**

**Claims priority, application Fed. Rep. of Germany, 330728**

**Int. Cl.[4] B21D *7/024***

**U.S. Cl. 72—23** **8 Claims**



1. An apparatus for bending a tubular workpiece to assume a shape including two substantially parallel end portions joined by a central portion of predetermined curvature, said apparatus comprising:

base plate means having a substantially horizontal upper surface,

template means including contour adjustment means mounted on said base plate surface and having a contour commensurate with said shape, said template means comprising a tape-like elastically deformable shaped member and adjustment elements rigidly supported by said base plate by means of socket members, and said template contour being adjustable within limits determined by quality variations of said workpiece,

generally horizontally displaceable shoe means adapted to deflect a straight tube length placed in front of said template means into engagement with the latter, adjacent shoe means being connected by an elastic tape extended substantially parallel to said tube length,

hydraulic cylinder means respectively drivingly connected to said shoe means,

control means selectively connecting said hydraulic cylinder means to a source of hydraulic pressurized fluid,

said displaceable shoe means comprising a first set of shoes driven by hydraulic cylinders stationarily mounted on said base plate means and adapted to bend said tube length to assume said central portion shape, and at least one second set of movable shoes, consisting of two shoes adapted to provide bending of said tube end portions,

each shoe of said second set being mounted, together with its hydraulic cylinder means, on a lever means pivotable in a plane parallel to said upper horizontal surface for shoe and cylinder movement along an adjacent tube end portion,

said control means being enabled and disabled in sequence such that

first, said first set of shoes are operated by associated hydraulic cylinders to clamp said tube to said template means at its said central portion of the tube length,

thereafter, while maintaining engagement of said shoes of said first set with said tube so that the latter is firmly clamped to said template means, said lever means is pivoted incrementally about predetermined angles and in each position so achieved, the hydraulic cylinder means of the shoes of said second set are actuated so as to incrementally bend said end portions of said tube length progressively from inner to outer ends of said end portions.

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**4,712,407**

## APPARATUS FOR WORKING SURFACE OF METAL PIPE

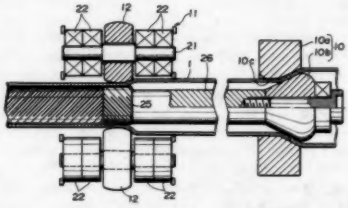
**Naokazu Yoshiki; Yutaka Saito, and Tsuneo Haba, all of Kitamoto, Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 19, 1985, Ser. No. 725,275**

**Claims priority, application Japan, Mar. 30, 1985, 60-46948**

**Int. Cl.[4] B21B *23/00***

**U.S. Cl. 72—68** **7 Claims**



1. An apparatus for working inner and outer surfaces of a metal pipe comprising:

means for drawing the metal pipe to reduce a diameter thereof;

means for working the inner and outer surfaces of the metal pipe to form at least one of the inner and outer surfaces thereof into a predetermined configuration; and

said working means including a rolling unit and a driving mechanism therefor, said rolling unit including a housing having end members each provides with a central bore, a plurality of rolling rolls rotatably disposed within said housing and outside the metal pipe so that said rolling rolls have their respective axes extending at an inclination angle with respect to an axis of the metal pipe and are in pressure contact with the metal pipe, and support shafts each having axial opposite ends thereof rotatably supported by said housing through thrust bearing means, said rolling rolls being respectively mounted on said end members on said driving mechanism and driven by said driving mechanism to revolve said rolling rolls around the metal pipe, said working means further including a plug floatingly disposed within the metal pipe at a position corresponding to said rolling rolls, said driving mechanism comprising an outpput shaft having a free end and having therein an axial bore for allowing the metal pipe to pass therethrough, a connecting flange mounted on said free end of said output shaft for rotating therewith, said connecting flange having formed therein a recess, and a cap member threadedly engaging with said connecting flange for securing said rollng unit within said recess so that said axial bore in said output shaft is in coaxial communication with the respective central bores in said end members of said housing; said recess in said connecting flange having

a peripheral wall surface tapering so as to diverge away from the free end of said output shaft, said cap member having a tapered surface tapering so as to diverge toward the free end of said output shaft, said driving mechanism further comprising a split sleeve having an inner peripheral surface thereof and an outer peripheral surface comprising a first tapered surface and a second tapered surface, said first tapered surface tapering so as to diverge toward the free end of said output shaft, said second tapered surface tapering so as to diverge away from the free end of said output shaft, said split sleeve being disposed in position with said first tapered portion being engaged with the peripheral wall surface of said recess in said connecting flange while said second tapered portion is engaged with the tapered surface of said cap member, so that the split sleeve is deformed into a shape of a reduced diameter to be brought into firm engagement with the outer peripheral surface of the rolling unit, thereby securing the rolling unit in position.

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**4,712,408**

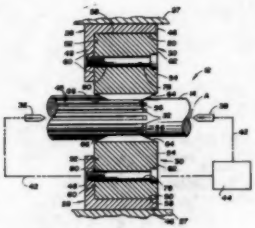
## COARSE PITCH SPLINE ROLLING

**James T. Killop, Warren, Mich., assignor to Anderson-Cook, Inc., Fraser, Mich.**

**Continuation of Ser. No. 779,260, Sep. 23, 1985, abandoned, which is a continuation of Ser. No. 358,178, Mar. 15, 1982, abandoned. This application Nov. 10, 1986, Ser. No. 928,701**

**Int. Cl.⁴ B21H** *5/00*

**U.S. Cl. 72—88** **8 Claims**



1. Apparatus for rolling splines of a coarse pitch comprising: a pair of rack boxes; a pair of racks fixedly mounted on said rack boxes moveable reciprocatingly on a path, each of said racks including a toothed forming face and flat side surfaces, said forming faces each including teeth spaced along the length thereof and having a linear pitch of less than 16 teeth per inch, said teeth of the rack bodies each including an origin and elongated sides upwardly tapering from said origin and extending perpendicular relative to the path and having a substantially flat top surface and a tapered end extending from the tooth origin at the side surface of the rack to the top surface; drive means for respectively driving said pair of racks thereon in a reciprocating manner; and workpiece mount means for rotatably supporting a workpiece between said racks and moving the workpiece along the axis of rotation thereof as said drive means drives said pair of racks in a reciprocating manner in a direction of said teeth having said tapered end such that the racks roll form splines progressively along the length of the workpiece.

**4,712,409**

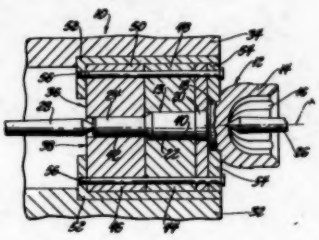
## THREADING AND PROJECTION FORMING ON DIFFERENT SIZE DIAMETERS

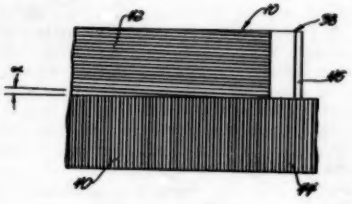
**James T. Killop, Warren, Mich., assignor to Anderson-Cook, Inc., Fraser, Mich.**

**Continuation of Ser. No. 564,478, Dec. 21, 1983, abandoned. This application Sep. 5, 1985, Ser. No. 772,792**

**Int. Cl.⁴ B21H** *3/06, 5/02*

**U.S. Cl. 72—88** **4 Claims**





1. A die of the type to be mounted in opposed relationship to an identical die on a support assembly defining a support axis for rotatably supporting a workpiece and defining a rotary axis for the workpiece, the dies being spaced apart from each other at the rotary axis on opposite side of the workpiece shaft portions, the workpiece including a first shaft portion having a diameter $D_1$, and a second shaft portion having a diameter less then $D_1$, said die comprising: a work surface having a spline forming portion (40) for engaging and cold forming splines in the first shaft portion (22) of the workpiece and a thread forming portion (42) for forming threads on the second shaft portion (24), said spline and thread forming portions (42,44) being disposed in side by side immovable relationship with respect to each other, said spline forming portion (44) being recessed with respect to said thread forming portion (42) for accommodating the greater diameter $D_1$ of the first shaft portion (22) to simultaneously engage the respective shaft portions (22,24) with the respective spline and thread forming portions (44,42), said thread forming portion including thread forming projections having a constant pitch and a lead angle $\alpha$ wherein

$$\text{tangent } \alpha = \frac{P}{\pi D}$$

where P equals said constant pitch and D equals the diameter of the first portion of the workpiece shaft.

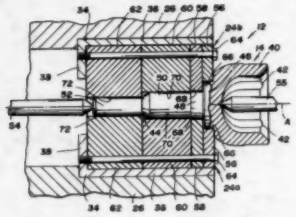
## 4,712,410
## METHOD AND APPARATUS FOR COLD SIZING A ROUND WORKPIECE HAVING MULTIPLE DIAMETERS

James T. Killop, Warren, Mich., assignor to Anderson-Cook, Inc., Fraser, Mich.

Continuation of Ser. No. 458,325, Jan. 17, 1983, abandoned. This application Oct. 15, 1985, Ser. No. 787,273

Int. Cl.[4] B21B *1/08, 27/00*

U.S. Cl. 72—108 6 Claims



1. A method for cold sizing a preformed metal workpiece shaft having a plurality of cylindrical coaxial portions with round surfaces of different diameters, said method comprising: supporting the workpiece for free rotation about the shaft axis between a pair of die assemblies having a plurality of opposed pairs of sizing surfaces corresponding in number to the shaft portions so that each shaft portion can be disposed between a respective one of the opposed pairs of sizing surfaces, each sizing surface extending parallel to the shaft axis for a distance corresponding to the axial length of the respective shaft portion; and moving the die assemblies relative to each other such that their respective sizing surfaces move in opposite directions to simultaneously engage each of the opposed pairs of sizing surfaces with the round surfaces of the respective shaft portions as the workpiece rotates about the shaft axis so that the sizing surfaces simultaneously apply pressure to the respective shaft portions to reduce the diameters by an amount within 20 thousandths of an inch of the preformed diameters.

## 4,712,411
## APPARATUS FOR MAKING A FORGED METAL ARTICLE

Roy S. Goodwin, St. Thomas, Canada, assignor to Clevite Industries Inc., Glenview, Ill.

Filed May 15, 1986, Ser. No. 863,290

Int. Cl.[4] B21D *45/02;* B21K *1/30*

U.S. Cl. 72—344 3 Claims

1. An apparatus for producing in a single stroke a forged metal article with a helical contoured surface comprising:

a die assembly having a die passage there-through and a die having a helical profiled surface in said assembly,

upper and lower punch assemblies, said die assembly being disposed between said punch assemblies,

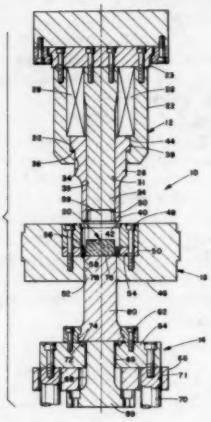
said upper punch assembly comprising an upper punch housing, a first forging punch mounted in said housing and a punch sleeve surrounding said first punch,

means for axially reciprocating said upper housing relative to said die assembly to reciprocate said first punch and sleeve with respect to said die assembly,

said sleeve being slidably mounted in said upper housing for axial telescopic retraction into said upper housing relative to said first punch,

said lower punch assembly including a second forging punch extending into said die passage in opposed relationship with said first punch, said second punch being adapted to support an article to be forged in said die assembly and having mounting means allowing for free rotation with respect to the axis of the die assembly,

said upper and lower punches having a generally smooth surface with no helical form incorporated therein, and



means for axially raising said second punch in said die passage to eject a forged article from said die assembly.

## 4,712,412
## DRAWING APPARATUS IN PRESSES

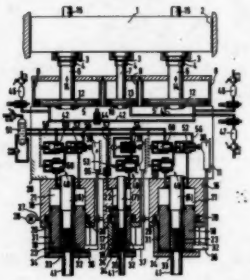
Gerhard Roos, Ebersbach; Hartmut Dexling, Gingen, and Wolfgang Michael, Goeppingen, all of Fed. Rep. of Germany, assignors to L. Schuler GmbH, Goeppingen, Fed. Rep. of Germany

Filed Feb. 11, 1986, Ser. No. 828,173

Claims priority, application Fed. Rep. of Germany, Feb. 21, 1985, 3505984

Int. Cl.[4] B21D *24/02*

U.S. Cl. 72—345 20 Claims



1. Drawing apparatus for presses having a system for resisting the amount of press force and ejecting a work piece comprising:

first pressure piston-cylinder means for resisting the amount of press force; second pressure piston-cylinder means for ejecting the work piece; pressure cheek means displaceably guided in a press table in response to the press force to an end position and supported by said first and second pressure piston-cylinder means;

said first and second pressure cylinder means having one of a cylinder or piston portions thereof, fixedly mounted at said pressure table; where, upon release of said press force a first follower means causes a non-fixed portion of the second pressure piston-cylinder means to displace the cheek means in a direction opposite to said displacement

caused by said press force and with a non-fixed portion of said first pressure piston-cylinder means being disconnected from and no longer supporting the cheek means.

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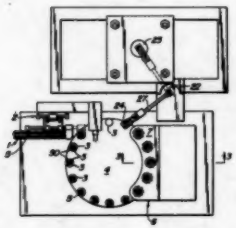
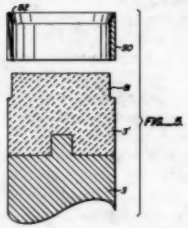
4,712,413

## BILLET HEATING PROCESS

Alan A. Koch, Maryland Heights, Mo., assignor to Alumax, Inc., San Mateo, Calif.

Filed Sep. 22, 1986, Ser. No. 909,554
Int. Cl.[4] B21D *37/16, 43/10*
U.S. Cl. 72—361 19 Claims





12. In a process for continuously producing shaped metal parts comprising the steps of:

supporting and positioning a plurality of freestanding metal preforms,

indexing said preforms sequentially through a plurality of separate induction heating stations for sequentially raising the heat content of said preforms to a level at which the preforms are partially liquid and partially solid, while the preforms remain freestanding and said preforms pass through each of said heating stations,

transferring said freestanding preforms with a mechanical gripper from said supporting means to a shaping means while the preforms remain substantially in their initial shape and partially liquid-partially solid state,

shaping said preforms while in said partially liquid-partially solid state into shaped metal parts and recovering said preforms after being shaped into solidified metal parts,

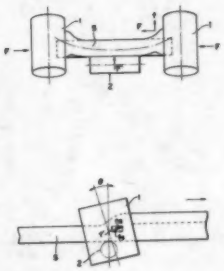
the improvement comprising providing a ring of material around said means for supporting said preforms, a portion of said ring extending above said means for supporting said preform which acts as a heat sink to absorb heat from the liquid portion of said preforms to substantially solidify said liquid portion and substantially prevent said preforms from losing said liquid to runoff.

4,712,414

## ROLLING METHOD OF PLATE-LIKE STOCK MATERIAL BY EDGER, AND CONTINUOUS HOT ROLLING MILL

Ichiro Kokubo, Hyogo; Atsuo Mizuta, Kobe; Yoshitaka Yamamoto, Hyogo, and Jitsuo Kitazawa, Kobe, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Continuation of Ser. No. 630,725, Jul. 13, 1984, abandoned. This application Feb. 28, 1986, Ser. No. 834,509
Claims priority, application Japan, Jul. 13, 1983, 58-128590; Jul. 13, 1983, 58-128592; Sep. 16, 1983, 58-171615; Oct. 3, 1983, 58-185783; Dec. 21, 1983, 58-242776; Jan. 10, 1984, 59-003079; Feb. 4, 1984, 59-019244
Int. Cl.[4] B21B *1/30, 39/02*
U.S. Cl. 72—366 3 Claims



1. A process for width reduction of plate-like stock material, which method comprises:

positioning said first and second single driven vertical rolls in spaced relationship on opposite end portions of a table roller;

feeding said plate-like stock material between said first and second driven single vertical rolls such that opposite side edger of said stock material respectively are engaged by said first and second driven single vertical rolls;

tilting the central axis of said first and second driven single vertical rolls so as to be tilted in a direction opposite the advancing direction of the stock material in respective vertical planes which are parallel to the advancing direction of the stock material;

contacting said plate-like material with said table roller such that said table roller supports said plate-like stock material via a counter force;

maintaining the first and second single vertical rolls tilted toward the direction opposite the advancing direction of the plate-like stock material and simultaneously bringing the plate-like stock material into engagement with the first and second single vertical rolls so as to be edged by the first and second single vertical rolls and rotating said rolls so as to apply an upward force on edges of said plate-like stock material and develop a downward bending deformation in the plate-like stock material has a downward convex shape; and

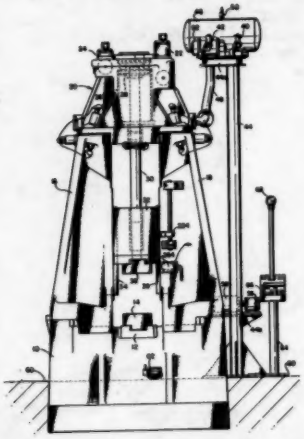
receiving the downward bending deformation of the plate-like stock material as a reaction force by said table roller, to thereby perform edging of the stock material while balancing bending moments, which are developed in the plate-like stock material during edging of the plate-like stock material, by means of said table roller.

4,712,415

## METHOD OF DETERMINING STROKE LENGTH OF A PNEUMATIC FORGING HAMMER USING SENSED PEAK PRESSURE

Charles J. Crout; Charles W. Frame, both of Chambersburg, and Ronald N. Harris, Ft. Loudon, all of Pa., assignors to Chambersburg Engineering Company, Chambersburg, Pa.

Division of Ser. No. 695,697, Jan. 28, 1985, Pat. No. 4,653,300.
This application Jan. 5, 1987, Ser. No. 575
Int. Cl.[4] B21J 9/16
U.S. Cl. 72—8 2 Claims



1. The method of determining required energy input based on forging size measurements employing an impact device having a frame supporting at least one cylinder, a piston within said cylinder, means connecting the piston to a ram such that the ram is repeatedly movable relative to the frame from a retracted position into impact position, a driving fluid system including a fluid supply, valve means connecting said fluid supply into said at least one cylinder at a position in the cylinder to drive the ram into impact position and permitting release of fluid from the cylinder, and a trapped volume of compressible lifting fluid causing the ram to be retracted from impact position when fluid driving the ram into impact is released from the cylinder, comprising: sensing lifting air pressure, determining the peak of the lifting air pressure, examining a compilation of pressure versus stroke data for various residual lifting air pressures to determine the stroke, calculating the relative forging size by subtracting the actual stroke from the maximum stroke, calculating the rate of deformation from the forging size of the previous blow and the forging size of the current blow and, if the forging size is less than a predetermined minimum amount, adjusting valve means to provide only sufficient impact energy needed to finish the forging.

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4,712,416

## SIX-HIGH ROLL STAND WITH OFFSET INNER BACKUP ROLLS

Hans Rönnen, Dormagen, and Erich Stoy, Ratingen, both of Fed. Rep. of Germany, assignors to SMS Schloemann-Siemag AG, Dusseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 710,837, Mar. 12, 1985, abandoned.
This application Sep. 25, 1986, Ser. No. 912,200
Claims priority, application Fed. Rep. of Germany, Mar. 13, 1984, 3409162; Feb. 5, 1985, 3503756
Int. Cl.[4] B21B 31/20, 35/06
U.S. Cl. 72—241 8 Claims

1. In a six-high rolling stand comprising:

a pair of upper and lower working rolls defining a nip and having respective axes lying in a vertical working-roll plane;

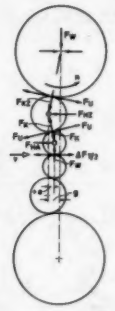
a pair of upper and lower inner backup rolls vertically flanking and bearing on the working rolls, said inner backup rolls having respective axes lying in a vertical inner-back-up-roll plane;

a pair of upper and lower outer backup rolls vertically flanking and bearing on the inner backup rolls, said outer backup rolls having respective axes lying in a vertical outer-backup-roll plane;

a frame;

respective journal blocks carrying the rolls in the frame and supporting the rolls therein for rotation about the respective axes so that all of said axes are substantially parallel;

drive means connected directly to the outer backup rolls for



oppositely rotating same, the upper and lower rolls vertically engaging one another, whereby the rotation of the outer backup rolls is transmitted through the inner backup rolls to the working rolls; and

actuator means braced between some of the journal blocks and the frame for displacing at least some of the rolls horizontally perpendicular to the planes, the improvement wherein the actuator means are braced between the journal blocks of the inner backup rolls and the frame and are provided with means enabling them to be continuously adjusted for displacing the inner backup rolls and the respective axes horizontally perpendicular to said planes to a position in which said inner-backup-roll plane is offset horizontally from said outer-backup-roll plane and said working-roll plane is offset from both said backup-roll planes and is located between said backup-roll planes.

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4,712,417

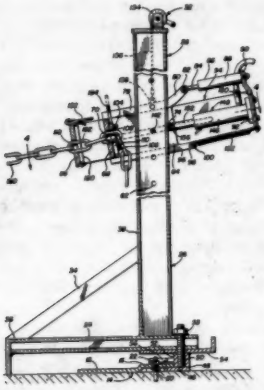
## SWIVEL PULL TOWER

Davis R. Jarman, Hortense, and Virgil H. Hinson, Brunswick, both of Ga., assignors to Grabber Manufacturing Company, Brunswick, Ga.

Filed Feb. 28, 1986, Ser. No. 834,564
Int. Cl.[4] B21D 1/12
U.S. Cl. 72—447 9 Claims

1. In combination with a floor anchored elongated track including inner and outer longitudinal marginal portions and wherein said outer marginal portion is spaced above an associated floor, a pull tower assembly including a horizontally elongated base having inner and outer ends and an upright anchored relative to and projecting upwardly from said outer end, a foot assembly mounted beneath said outer end for angular displacement relative thereto about an upstanding axis and embracingly engaging said outer longitudinal marginal portion for adjusted shifting therealong, said inner end of said base projecting inwardly of said inner longitudinal marginal portion and including downwardly facing abutment means for abutting said floor inwardly of said track, a horizontally elongated guide having inner and outer ends and opposite side plates

between which said upright is slidingly received, a horizontally elongated pull arm including opposite side plates between which said guide is slidably received and also having inner and outer ends, corresponding to the first and second mentioned inner and outer ends, pivot means pivotally mounting an intermediate length portion of said guide from said upright for oscillation relative thereto about a horizontal axis extending transversely of said upright, base and pull arm and slidingly guidingly supporting said pull arm from said guide for longitudinal shifting relative thereto, force means operatively connected between said pull arm and upright for longitudinally shifting said pull arm relative to said pivot means and guide in a direction to shift said inner end of said pull arm toward said upright, first link chain section link anchoring means carried by said inner end of said pull arm for releasably anchoring a link chain section link relative to said pull arm and second link chain section link anchoring means anchored relative to said guide outwardly of said inner end of said pull arm and inwardly of said upright and to which a link chain section link may be anchored.



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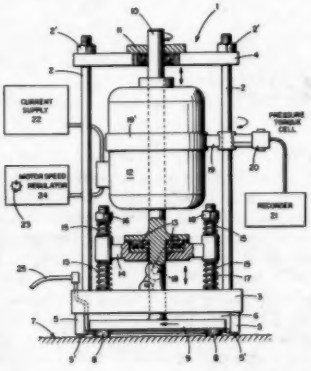
**4,712,418**

## APPARATUS FOR THE MEASUREMENT OF SURFACE FRICTION

**Harald Augustin, Arsenal Objekt 7/4/16, A-1030 Wien, Austria**

**Filed Feb. 26, 1986, Ser. No. 833,207**
**Claims priority, application Austria, Feb. 26, 1985, 569/85**
**Int. Cl.[4] G01N** *19/02;* **G01L** *5/00*
**U.S. Cl. 73—9** **4 Claims**



1. Apparatus for the measurement of the friction of surfaces designed for traffic, such as road surfaces, floor coverings, and similar surfaces, said apparatus comprising:

a supporting assembly that can be positioned on the surface to be measured,

drive means carried on said supporting assembly and including an output shaft,

a rotor secured to said output shaft and having an axis of rotation that is perpendicular to the surface and having at least one contact member for contacting the surface,

adjustable pressure means carried by said support assembly for adjusting the contact force between the contact members and the surface, and

measuring means for measuring the torsional resistance to rotation of the drive means as a result of frictional contact between the contact member and the surface to be measured,

wherein said drive means is positioned coaxially with said rotor and included a motor casing, restraining means extending from said motor casing in a plane substantially perpendicular to the rotor axis and against the supporting assembly to prevent angular motion of the motor casing, said measuring means operative for measuring the torsional resistance exerted by the motor casing on the supporting assembly and mounted to measure the torque between the restraining means and the supporting assembly.

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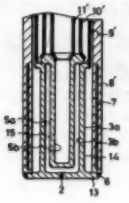
**4,712,419**

## AIR/FUEL RATIO DETECTOR

**Tadayoshi Ikai, and Takashi Kamo, both of Aichi, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed May 13, 1986, Ser. No. 862,718**
**Claims priority, application Japan, May 13, 1985, 60-70489[U]; Jun. 17, 1985, 60-91090[U]**
**Int. Cl.[4] G01M** *15/00*
**U.S. Cl. 73—116** **19 Claims**



1. An air/fuel ratio detector comprising:

a first element of tubular shape made of an oxygen ion permeable solid electrolyte and having one end closed and inner and outer sides formed with electrodes which are connected with a d.c. power source to form an oxygen pump;

a second element of tubular shape made of an oxygen ion permeable solid electrolyte and having one end formed with gas diffusion means, inner and outer sides of said second element being formed with electrodes which are connected with a voltage source to form a limit current type oxygen sensor; and

a tubular heater having a heating element therein,

wherein said first element is inserted into said second element such that a first space is formed between an outer side of said first element and an inner side of said second element, wherein said second element is inserted into said tubular heater such that a second space is formed between the outer side of said second element and the inner side of said tubular heater and wherein said one end of said second element and an end of said tubular heater include means to seal said second space.

## 4,712,420
## ARRANGEMENT IN A MAGNETIC POSITION INDICATOR

Hans Johansson, and Anders Göras, both of Amal, Sweden, assignors to Saab-Scania AB, Sodertalje, Sweden

Filed Feb. 28, 1986, Ser. No. 834,567
Claims priority, application Sweden, Feb. 28, 1985, 8500977
Int. Cl.[4] G01M *19/00*; G01D *5/12*
U.S. Cl. 73—118.1 9 Claims

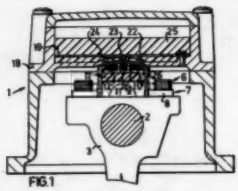


FIG.1

1. Apparatus for sensing in a gearbox the position of a gear selector rod that is axially displaceably and pivotably mounted in a gearbox housing, said apparatus comprising: a first and a second bar-shaped magnet disposed at mutually right angles and rigidly connected to said selector rod, each of said magnets having a long side and a free pole; a plurality of transducers rigidly connected to the gearbox housing and facing the free poles of said magnets for sensing the magnetic field of said magnets; at each long side of each of said first and second magnets and adjacent magnet disposed in parallel with the respective first or second magnet, each of said adjacent magnets having a free pole disposed in the vicinity of the free pole of the respective first or second magnet, the free poles of the first and the second magnets having a polarity reverse to that of the free poles of the adjacent magnets, each magnet having opposite to its free pole a second pole directed away from the transducers, at least the second poles of the mutually parallel magnets being magnetically connected, whereby the strength of the magnetic field facing the transducers is increased by the reduction in magnetic resistance attributable to said adjacent magnets.

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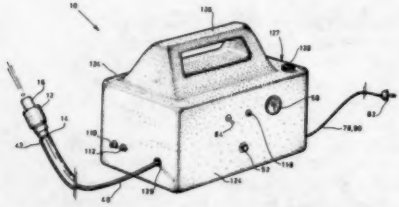
## 4,712,421
## FUEL INJECTOR TESTING DEVICE

Jeffrey H. Young, 606 Ardmore Cir., Maryville, Tenn. 37801

Filed Sep. 8, 1986, Ser. No. 904,396
Int. Cl.[4] G01M *15/00*
U.S. Cl. 73—119 A 14 Claims




1. A portable fuel injector testing device for supplying a test fluid, under a preselected pressure, to a fuel injector of the type utilized for injecting fuel in an internal combustion engine to test and visually view the fuel spray pattern of said fuel injector when said injector is removed from said engine, said fuel injector having an inlet port for receiving said fuel, an outlet nozzle for generating said fuel spray pattern, and internal electrical control means, said fuel injector testing device being electrically powered by a suitable electrical power supply, said fuel injector testing device comprising:

a reservoir for holding said test fluid;

pumping means for pumping said test fluid, said pumping means having a pump provided with an inlet port and an outlet port, and a fluid supply conduit for establishing fluid communication between said inlet port of said pump and said reservoir, whereby said pump selectively pumps said test fluid from said reservoir into said inlet port and out of said outlet port of said pump under pressure;

injector supply means for selectively engaging, and communicating said test fluid to, said fuel injector, said injector supply means having an injector supply conduit for establishing fluid communication between said outlet port of said pump and said inlet port of said fuel injector, said injector supply conduit being provided with a first electrically controlled valve for selectively initiating and interrupting the flow of said test fluid to said fuel injector to generate and cease said spray pattern, respectively;

pressure regulating means for maintaining said test fluid supplied to said fuel injector at said preselected pressure, said pressure regulating means having a pressure regulator defining an inlet port in fluid communication with said injector supply conduit and an outlet port, and a fluid return conduit for establishing fluid communication between said outlet port of said pressure regulator and said reservoir whereby said test fluid communicated through said pressure regulator is returned to said reservoir;

a first electrical control circuit connected between said pump and said electrical power supply for selective operation of said pump;

a second electrical control circuit connected to said first electrically controlled valve for selectively controlling flow of said test fluid to said fuel injector; and

a third electrical control circuit connected to said electrical control means of said injector to selectively energize said control means to produce said spray pattern when said test fluid is provided to said fuel injector by said first electrically controlled valve.

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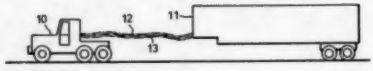
## 4,712,422
## TRACTOR-TRAILER FLUID PRESSURE BRAKE MONITORING SYSTEM

Dougald G. Munro, 4363 Garnetwood Chase, Mississauga, Ontario, Canada L4W 2H1

Filed Aug. 19, 1986, Ser. No. 898,016
Int. Cl.[4] G01L *5/28*
U.S. Cl. 73—129 7 Claims




1. In a tractor-trailer fluid pressure brake system in which a driver-operated first brake valve is operable to release fluid for applying the tractor and trailer brakes simultaneously, and a driver-operated second brake valve is operable independently of the first brake valve to release fluid for applying the trailer brakes selectively, an improved tractor-trailer brake monitoring system comprising

circuit means including a monitoring switch responsive to operation of the second brake valve for producing a signal in accordance with operation thereof, and

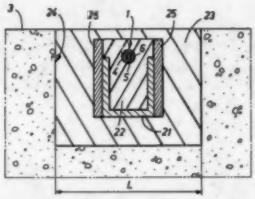
a timer circuit interconnected with said circuit means and responsive to said signal for registering the duration of selective trailer brake usage.

4,712,423

## PROCESS AND APPARATUS FOR MEASURING THE DYNAMIC LOADS APPLIED TO A HIGHWAY BY THE ROAD TRAFFIC

Marcel Siffert, Bazainville; Gervais Briant, Le Perray En Yvelines; Pierre Feunten, Elancourt; Honoré Goscolou, Les Clayes/Bois; Jean-Claude Petitgrand, Prunay Sous Ablis, and Francois Peyret, Angers, all of France, assignors to Laboratoire Central Des Ponts Et Chaussees, Paris, France

Filed Feb. 7, 1986, Ser. No. 827,770
Int. Cl.[4] G01G *19/52*
U.S. Cl. 73—146 11 Claims



1. A process for measuring the dynamic loads applied to a highway by the road traffic, in which a rectilinear piezo-electric cable is placed across the highway so that the wheels of the axles of the vehicles circulating on the highway subject it, upon passage thereof, to a pressure to which it responds by the emission of an electrical pulse and the corresponding dynamic load is calculated from the parameters of said pulse, whilst the speed of the vehicle is measured with the aid of the pulse delivered by a second rectilinear piezo-electric cable disposed on the highway at a certain distance from the first-mentioned cable, by determination of the duration of the time gap separating the appearance of the pulses respectively furnished by the two cables for the same wheel,

the dynamic load being deduced from the area of the contour, with respect to time, of the pulse delivered by the first-mentioned cable and from the speed of the vehicle, by making the product of said area by said speed.

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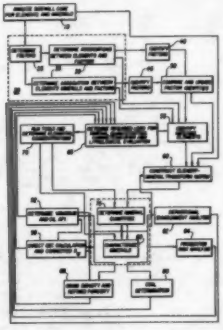
4,712,424

## QUANTITATIVE DETERMINATION BY ELEMENTAL LOGGING OF SUBSURFACE FORMATION PROPERTIES

Michael M. Herron, Danbury, Conn., assignor to Schlumberger Technology Corp., New York, N.Y.

Continuation-in-part of Ser. No. 574,481, Jan. 26, 1984. This application Sep. 28, 1984, Ser. No. 656,104
Int. Cl.[4] E21B *49/00*
U.S. Cl. 73—152 48 Claims



1. A method for investigating, through borehole measurements, an earth formation traversed by a borehole comprising:

(a) making measurements in said borehole at least by spectroscopy of nucelar radiation artifically induced in said formation;

(b) determining, from said measurements, concentrations of a plurality of elements in said formation;

(c) quantifying a plurality of attributes of said formation, including at least one clay mineral, by operating with a single-pass element-attribute transform on said elemental concentrations; and

(d) producing a tangible record of the quantities of said attributes.

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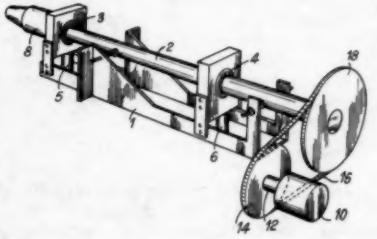
4,712,425

## WHEEL BALANCING MACHINE, PARTICULARLY FOR AUTOMOBILE WHEELS

Claude Augendre, Dreux; Jean-Loup Rapidel, Paris, and Jacques Hennes, Ezy-sur-Eure, all of France, assignors to Facom, Morangis, France

Filed Sep. 11, 1986, Ser. No. 906,076
Claims priority, application France, Sep. 12, 1985, 85 13555
Int. Cl.[4] G01M *1/02*
U.S. Cl. 73—460 2 Claims



1. A wheel balancing machine, particularly for automobile vehicle wheels, comprising a shaft which is mounted in two bearings, each provided with a force sensor, and is dr en rotationally by means of a transmission and a motor, wherein the transmission is a chain transmission comprising a chain whose pulling side is taut and is at right angles to the plane passing through the axes of sensitivity of the force sensors, while its driven side is slack.

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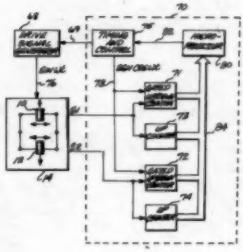
4,712,426

## SYNCHRONOUS FM DIGITAL DETECTOR

Rex B. Peters, Woodinville, Wash., assignor to Sundstrand Data Control, Inc., Redmond, Wash.

Filed Oct. 21, 1985, Ser. No. 789,657
Int. Cl.[4] G01P *9/04, 15/10*
U.S. Cl. 73—505 9 Claims



1. A system for determining the angular rate of rotation of a body about a rate axis, the system comprising:

first and second accelerometers having their sensitive axes parallel to a sensing axis perpendicular to the rate axis, the

first and second accelerometers being adapted to produce respective first and second output signals, each output signal having a frequency corresponding to the acceleration experienced by the respective accelerometer along its sensitive axis;

movement means including means for producing a periodic movement signal and means responsive to the movement signal for periodically moving the accelerometers along a movement axis perpendicular to the rate and sensing axes, whereby each output signal includes a periodic Coriolis component; and

processing means comprising means for producing a reference signal that is operative to define one or more first time periods during which the Coriolis components have one polarity and one or more second time periods during which the Coriolis components have the opposite polarity, the first and second time periods together comprising one or more complete periods of the movement signal, means for determining, for each output signal, a phase value representing the difference between the phase change of the output signal during the first time periods and the phase change of the output signal during the second time periods, means for adding the phase values to one another to determine a phase sum value and for subtracting the phase values from one another to determine a phase difference value, and means for linearly combining the phase sum and phase difference values to determine a value representing the angular rate of rotation of the body about the rate axis.

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**4,712,427**

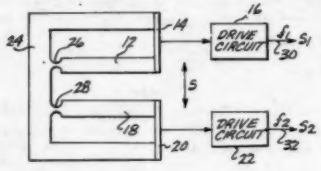
## VIBRATING BEAM ACCELEROMETER WITH VELOCITY CHANGE OUTPUT

**Rex B. Peters, Woodinville, Wash., assignor to Sundstrand Data Control, Inc., Redmond, Wash.**

**Continuation-in-part of Ser. No. 789,752, Oct. 21, 1985, abandoned. This application Sep. 17, 1986, Ser. No. 908,356**

**Int. Cl.[4] G01P** *15/10*

**U.S. Cl. 73—517 AV** **14 Claims**




1. An accelerometer for measuring velocity change along a sensitive axis, comprising:

a pair of acceleration sensors, each sensor being operative to produce an output signal having a frequency related to the acceleration along the sensitive axis, the sensors being arranged such that a given acceleration along the sensitive axis causes the frequency of one output signal to increase and the frequency of the other output signal to decrease; and

means for determining the velocity change $\Delta V$ along the sensitive axis during a selected time interval in accordance with the relation:

$$\Delta V = A[\Delta\phi + FT + B\Sigma\phi]$$

where A, F and B are nonzero constants, T is the length of said time interval, $\Delta\phi$ is the difference between the phase changes of the output signals over said time interval and $\Sigma\phi$ is the sum of the phase changes of the output signals over said time interval.

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**4,712,428**

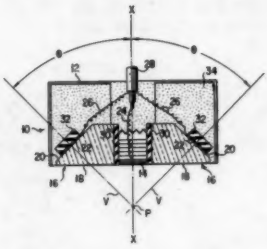
## ULTRASONIC FLAW DETECTOR PROBE

**Yugoro Ishii, Hino; Motohisa Onozawa, Sugakawa, and Akihiko Katamine, Yokohama, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**Filed Jul. 21, 1986, Ser. No. 887,247**

**Int. Cl.[4] G01N** *29/04*

**U.S. Cl. 73—644** **12 Claims**




1. A probe for ultrasonic flaw detection comprising:

(a) a housing having an open bottom and an axis passing therethrough;

(b) a first ultrasonic transducer disposes at the open bottom of the housing and centerd about the axis thereof;

(c) lens means disposed within the housing and exposed through the open bottom thereof, the lens means having at least one sloping surface at an angle to the axis of the housing;

(d) at least one pair of second ultrasonic transducers mounted on the sloping surface of the lens so as to provide paths of ultrasonic vibrations extending through the lens means, the paths of ultrasonic vibrations crossing each other at that point on the axis of the housing which is located outside the open bottom thereof.

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**4,712,429**

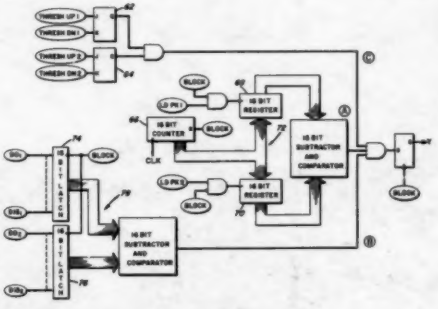
## WINDSCREEN AND TWO MICROPHONE CONFIGURATION FOR BLAST NOISE DETECTION

**Richard Raspet, Urbana, Ill., and Mark D. Wagner, Morristown, N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Dec. 15, 1987, Ser. No. 755,388**

**Int. Cl.[4] G01N** *29/00*

**U.S. Cl. 73—646** **15 Claims**




14. The apparatus of claim 11 wherein the processing means further comprise means for timing the duration of the pulse output from the multivibrators and for producing a pulse in response to coherency of the microphone signals as determined by the fixed time duration of the multivibrator pulses.

4,712,430

## PRESSURE TRANSDUCER

William Wareham, Marion, Mass., assignor to Dynisco, Inc., Norwood, Mass.

Continuation-in-part of Ser. No. 848,300, Aug. 4, 1986. This application Oct. 14, 1986, Ser. No. 918,087
Int. Cl.[4] G01L 7/08, 9/04
U.S. Cl. 73—706 28 Claims

1. A pressure transducer particularly for low pressure measurement comprising,

an elongated frame having means defining a passage, a flat surface at one end thereof, and mating means adjacent to the flat surface,

a capillary tube extending through the frame and terminating at one end adjacent another end of the frame,

a coupler closing the other end of the frame and defining with the frame a chamber in communication with the capillary tube,

a liquid filled deformable sensor including a cap member having an internal recess therein and mating means adjacent thereto for connecting with the mating means of the frame, said recess and flat surface defining a thin disc-shaped compartment in communication with another end of the capillary tube,

and a liquid filling the capillary tube, chamber and compartment for applying the pressure exerted against the coupler to the sensor,

said cap member having an outer substantially flat top wall having a diametrically disposed raised beam extending across its top surface and defining a gage receiving surface,

said cap member top wall having indentations therein on either side of an extending longitudinally of said raised beam.

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4,712,431

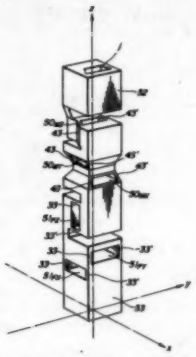
## MULTI-AXIS LOAD SENSOR

Yotaro Hatamura, 12-11, Kohinata 2-chome, Bunkyo-ku, Tokyo 112, Japan

Continuation of Ser. No. 605,212, Apr. 30, 1984, Pat. No. 4,628,745. This application May 27, 1986, Ser. No. 867,221
Claims priority, application Japan, Sep. 14, 1983, 58-168385
Int. Cl.[4] G01L 5/16
U.S. Cl. 73—862.04 33 Claims

23. A multi-axis load sensor adapted to be connected between a first rigid member (52) (72) and a second rigid member (53) (73) so as to detect the magnitude, direction and point of action of a force to be transmitted between the first and second rigid members (52, 53) (72, 73) wherein said multi-axis load sensor comprises in combination:

a first radial plate structure having a standard axis, which extends in a prescribed direction and is adapted to detect a moment component to be produced about the standard axis by the force, wherein said first radial plate structure comprises at least one pair of plates (43, 43') (81, 81') having a thicknesswise dimension smaller than a widthwise dimension thereof and arranged radially with respect to a prescribed point; and



at least one plate structure wherein said at least one plate structure comprises at least one pair of plates (33, 33') (77, 77') (43, 43') (81, 81') having a thicknesswise dimension smaller than a widthwise dimension thereof, said at least one plate structure having a standard axis which extends in a prescribed direction wherein the standard axis of said at least one plate structure is neither coincident with nor parallel to the standard axis of said first radial plate structure.

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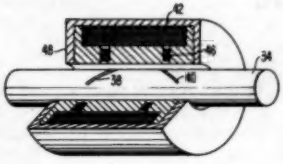
4,712,432

## TORQUE SENSOR

Peter A. Hochstein, Troy, and Nobuyuki Imai, Farmington Hills, both of Mich., assignors to Al Sin Seiki Kabushiki Kaisha, Kariya, Japan

Continuation-in-part of Ser. No. 676,859, Nov. 30, 1984, abandoned. This application Oct. 18, 1985, Ser. No. 789,108
Int. Cl.[4] G01L 3/10
U.S. Cl. 73—862.36 13 Claims



7. A torque sensor comprising:

a ferromagnetic member having at least two discontinuities, said discontinuities positioned at an angle of 60°–75° with respect to the central horizontal axis of said ferromagnetic member;

a primary coil for establishing an induced excitation current in said ferromagnetic member thereby generating a magnetic leakage flux at said discontinuities;

two differentially connected secondary coils, a different one of said secondary coils for measuring the change in leakage flux at each of said discontinuities when a torsional stress is applied to said ferromagnetic member; and

amplitude and phase means for deriving the amplitude and phase of the induced current output of said secondary coils.

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**4,712,433**

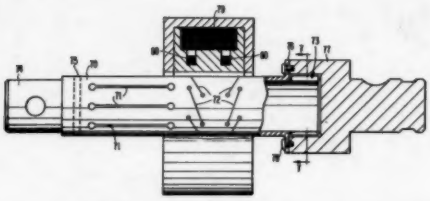
## TORQUE SENSOR FOR AUTOMOTIVE POWER STEERING SYSTEMS

**Peter Hochstein, Troy, and Nobuyuki Imai, Farmington Hills, both of Mich., assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan**

**Filed Oct. 18, 1985, Ser. No. 789,109**

**Int. Cl.[4] G01L *3/10***

**U.S. Cl. 73—862.36** **13 Claims**



1. A noncontacting, leakage flux torque sensor for an automotive, electrically powered steering assist system comprising:

an input shaft;

an output shaft;

a ferromagnetic member fixed to both said input shaft and said output shaft so as to transfer torque to said output shaft from said input shaft, said ferromagnetic member having at least one discontinuity;

a lost motion connection means for directly coupling said input shaft to said output shaft so that said input shaft may rotate a predetermined distance with respect to said output shaft before said lost motion connection means engages said output shaft, said lost motion connection means, when engaged, coupling said input and output shafts and thereby shunting additional torque directly from said input shaft to said output shaft;

a primary coil for establishing an induced excitation current in said ferromagnetic member thereby generating a magnetic leakage flux at said discontinuity;

two differentially connected secondary coils for measuring the change in leakage flux at said discontinuity when a torsional stress is applied to said ferromagnetic member to rotate said member less than said predetermined distance; and

amplitude and phase means for deriving the amplitude and phase of the induced current output of said secondary coils.

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**4,712,434**

## DEVICE FOR EMISSION-FREE SAMPLING OF VOLATILE LIQUIDS

**Jens Herwig, Cologne; Hagen Nörenberg, Dormagen; Friedhelm Bergmann, Cologne; Manfred Stiller, Dormagen; Horst Schlemmermeyer; Wilfried Schmidt, both of Cologne; Hilmar Straube, Pulheim, and Helmut Wolter, Cologne, all of Fed. Rep. of Germany, assignors to EC Erdolchemie GmbH, Koeln-Worringen, Fed. Rep. of Germany**

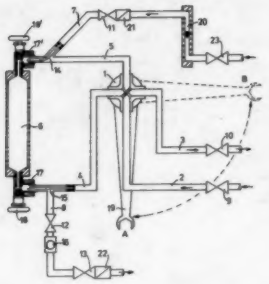
**Filed Oct. 1, 1986, Ser. No. 914,104**

**Claims priority, application Fed. Rep. of Germany, Oct. 25, 1985, 3537940**

**Int. Cl.[4] G01N *1/10***

**U.S. Cl. 73—864.63** **10 Claims**

1. A device for the emission-free sampling of volatile liquids, comprising: a 4-way tap having four lines and actuatable into two alternative states including a first state wherein a first and a second line are fluidly coupled and a third and a fourth line are fluidly coupled and a second state wherein the first and third lines are fluidly coupled and the second and fourth lines are fluidly coupled, wherein the first and second lines are fluidly connectable to a container holding the liquid to be tested, and the third and fourth lines are fluidly connectable to a sample bottle, a supply line for receiving an inert flushing medium and which is fluidly joined to the fourth line in a region of the connection to the sample bottle, and a discharge line for the inert flushing medium and which is branched from



the third line in a region of the connection to the sample bottle and fluidly connectable to a disposal system and wherein the sample bottle has a longitudinal axis and is connected in a position in which the longitudinal axis deviates from the horizontal and the fourth line which terminates at the sample bottle and the supply line for the inert flushing medium lie at a higher level with respect to gravity than the third line coming from the sample bottle and higher than the discharge line for the inert flushing medium.

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**4,712,435**

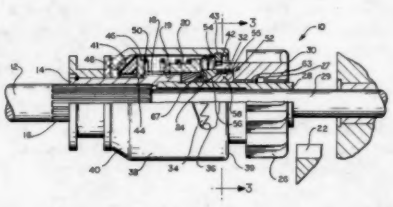
## ENGINE STARTER GEARING

**Walter N. Losey, Big Flats, and Paul F. Giometti, Horseheads, both of N.Y., assignors to Facet Enterprises, Inc., Tulsa, Okla.**

**Continuation-in-part of Ser. No. 575,199, Jan. 30, 1987, Pat. No. 4,611,499. This application Sep. 15, 1986, Ser. No. 907,744**

**Int. Cl.[4] F02N *11/00***

**U.S. Cl. 74—6** **9 Claims**



1. An engine starter gearing for selectively starting an engine having a starting gear, said engine starter gearing comprising:

a power shaft;

a sleeve slidably, but non-rotatably, secured to said power shaft, said sleeve having external helical splines formed on one extremity thereof;

a pinion gear slidably journalled to said power shaft for axial movement relative thereto, said pinion gear being adapted for movement into and out of engagement with said starting gear of said engine to be started;

a driven clutch member secured to said pinion gear for movement therewith;

a generally circular recess formed in said driven clutch member;

a molded plastic sleeve positioned within said generally circular recess formed in said driven clutch member, said

molded plastic sleeve having an exterior surface and an interior surface;

a driving clutch member slidably mounted on said helical splines of said sleeve, said driving and driven clutch members having complementary mutually engageable inclined teeth for transmitting torque therebetween in one direction of rotation;

a barrel housing having an open end, said barrel housing being slidably supported on said sleeve and spatially encompassing said driving and driven clutch members;

abutment means disposed within said barrel housing adjacent said open end thereof, said abutment means being adapted for engagement with said driven clutch member for confining said driving and driven clutch members within said barrel housing;

resilient means disposed within said barrel housing, said resilient means abutting said driving clutch member, said resilient means further biasing said driving and driven clutch members into mutual engagement;

a radially inwardly extending shoulder formed on said driving clutch member adjacent said circular recess of said driven clutch member;

an annular thrust washer loosely disposed in said generally circular recess of said driven clutch member, said annular thrust ring having an inner conical surface, said annular thrust ring being adapted to abut said radially inwardly extending shoulder of said driving clutch member when said annular thrust ring is displaced in a first axial direction;

a plurality of centrifugal flyweight members annularly arranged within said molded plastic sleeve, said plurality of centrifugal flyweight members each having an inclined surface abutting said conical surface of said annular thrust ring, said plurality of centrifugal flyweight members being operative to displace said annular thrust ring in said first axial direction in response to centrifugal force; and

a plurality of radially outwardly extending cavities formed in said interior surface of said molded plastic sleeve, each of said cavities of said plurality of cavities slidably receiving at least a portion of an associated centrifugal flyweight member of said plurality of centrifugal flyweight members to prevent circumferential movement of said plurality of centrifugal flyweight members while permitting radial movement thereof.

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**4,712,436**

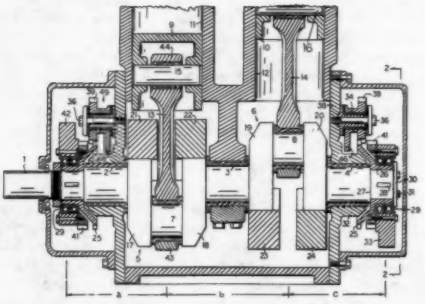
## BALANCERS FOR VARIOUS RECIPROCATING MACHINES USING ROTATING BALANCE WEIGHTS

**Arthur E. Brown, R.D. #1, Box 1107, Lake George, N.Y. 12845**

**Filed Oct. 2, 1985, Ser. No. 782,893**

**Int. Cl.[4] F16F *15/26***

**U.S. Cl. 74—44** **8 Claims**



1. In a reciprocating machine, the combination of a frame structure, a crankshaft mounted for rotation in said frame structure, said crankshaft having at least one crank, at least one reciprocable member guided for reciprocation, a connecting rod interconnecting said crank and said reciprocable member for respective rotary and reciprocable motion, at least one main counterweight attached to said crankshaft and rotatable therewith, two contraweights mounted for rotation around the axis of said crankshaft, said contraweights being adapted to rotate in the opposite direction to that of said crankshaft and at the same RPM as the crankshaft, said contraweights in cooperation with said main counterweight serving to counterbalance the primary reciprocating inertia forces of said reciprocable member,

and wherein the improvement comprises, two stub shafts, attached to one end of said frame structure, two more stub shafts attached to the other end of said frame structure making at least four stub shafts total, a secondary balance weight mounted for rotation on each of said stub shafts making at least four secondary balance weights total, pinion gears mounted for rotation on said four stub shafts making at least four such pinion gears total, two larger gears attached to said crankshaft and rotatable therewith, two more larger gears attached one to each of said contraweights making at least four larger gears total,

said pinion gears and said larger gears (at one end of the frame structure) meshing so as to drive two of said secondary balance weights at twice crankshaft speed and so as to drive one of said contraweights,

the remaining said pinion gears and the remaining said larger gears (at the other end of the frame structure) meshing so as to drive the remaining two secondary balance weights at twice crankshaft speed and so as to drive the other said contraweight, and said four secondary balance weights serving to counterbalance the secondary reciprocating inertia force of said reciprocable member.

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**4,712,437**

## GEAR FOR TRANSFORMING ROTARY MOTION TO RECIPROCATORY MOTION

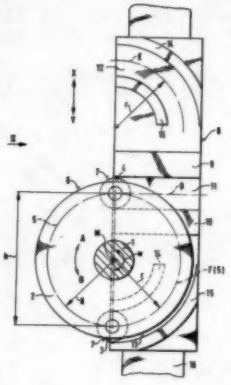
**Karl J. Gaigl, Stockach, Fed. Rep. of Germany, assignor to Fahr-Bucher GmbH, Gottmadingen, Fed. Rep. of Germany**

**Filed Oct. 18, 1985, Ser. No. 789,081**

**Claims priority, application Fed. Rep. of Germany, Oct. 19, 1984, 3438363; Dec. 12, 1984, 3444168**

**Int. Cl.[4] F16H *21/18, 21/54***

**U.S. Cl. 74—50** **8 Claims**



1. A gear for transforming or transmitting alternating rotary movement of a drive into linear movement which comprises: a first driver which rotates in a first radius about a center; a cam plate having a guidance channel for receiving the first driver and at least one reception groove; a second driver which rotates in a second radius about said center; said second driver engaging said at least one reception groove when the first driver is disengaged from said guidance channel and each said

reception groove has an axis with a radius about a center point which corresponds to said second radius, whereby said cam plate moves linearly along a first axis as said first driver is rotated about said center and moves along said guidance channel.

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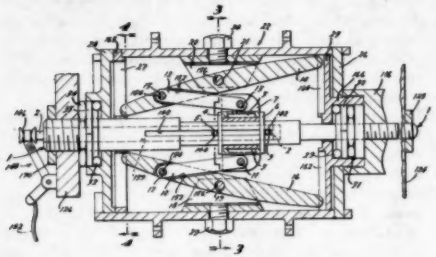
**4,712,438**
**VARIABLE SPEED CONTROL**

**Julius W. Nawojski, 38148 Medville, Sterling Heights, Mich. 48077, and Walter Nawojski, VA 35 FPO, New York, N.Y. 09501-6206**

**Filed May 1, 1985, Ser. No. 729,487**
**Int. Cl.[4] G05G 7/04**
**U.S. Cl. 74—63** **6 Claims**



1. In a bicycle hub for a bicycle wheel, including axle means and a sprocket secured to said axle means, a variable force mechanism comprising means disposed within the hub for connecting said axle means to said hub, including transmission means comprising at least one rocker arm pivotally secured to said axle means, slideably secured to said hub, and movable from a first position to a second position wherein disposition of said transmission means in said second position provides a greater resistance to rotation of said sprocket than disposition of said transmission means in said first position; and means for controlling the movement of said transmission means from said first position to said second position.

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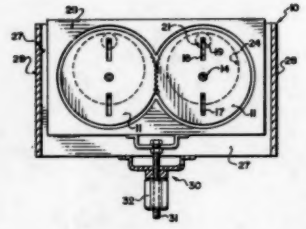
**4,712,439**
**APPARATUS FOR PRODUCING A FORCE**

**Henry North, R.R. #16, Thunder Bay, Ontario, Canada P7B 5E5**

**Filed Feb. 24, 1986, Ser. No. 832,235**
**Int. Cl.[4] F16H 33/02**
**U.S. Cl. 74—84 R** **15 Claims**



1. Apparatus for producing a force comprising a housing, a first and a second balanced flywheel, bearing means mounting each of said flywheels for rotation in the housing about one of a pair of spaced parallel axes, drive means for drivingly rotating each of said flywheels in opposed directions about its respective axis, a first and second mass, each flywheel including means for applying force to a respective one of the masses in a direction angularly of the respective axis such that the mass rotates therewith about the respective axis, each mass being free to move relative to the respective flywheel in a direction radially of the flywheel to define a rotating path of the mass around the axis of the respective flywheel, a first and second guide track means, means mounting said guide track means on said housing so as to be stationary relative thereto and so as to transmit forces from the guide track means to the housing, each guide track means providing an inwardly facing surface fully surrounding the rotating path of a respective one of the masses, each of said masses consisting of a shaft member having an axis parallel to the axis of the respective flywheel and spaced radially thereof, a body surrounding the shaft and symmetrically balanced around the axis of the shaft and bearing means mounting the body on the shaft to concentric balanced rotation therearound, said body having an outwardly facing peripheral surface for rolling on a respective one of said guide track means such that said rolling thereon causes rotation of the body about the shaft axis each said rotating body constituting a gyroscope, one of the guide track means being a mirror image of the other and each having a portion on one side of the axis of the respective flywheel which is spaced from the axis by a distance greater than a portion diametrically opposite thereto.

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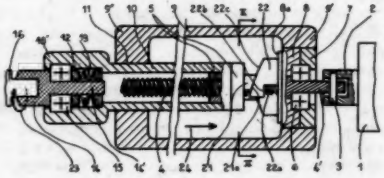
**4,712,440**
**LINEAR ACTUATOR**

**André Rousselot, Cluses, France, assignor to Somfy, France**

**Filed Jul. 10, 1985, Ser. No. 753,377**
**Claims priority, application France, Jul. 18, 1984, 84 11375**
**Int. Cl.[4] F16H 25/20**
**U.S. Cl. 74—89.15** **7 Claims**



1. A linear actuator comprising a motor having an output shaft which is connected kinematically to a first member,

a reversible screw-and-nut system capable of movement in a first and second direction, said system comprising said first member and a second member, said screw-and-nut system having a pitch in a first direction,

said second member of this screw-and-nut system being integral with an operating arm which moves parallel with said reversible screw, said second member capable of movement between a first axial position and a second axial end position, said second member of the screw-and-nut system includes at least one first profiled portion positioned on the outside of said second member,

a friction torque-limiter connected to said second member and to an intermediate member rotationally fixed and intended for being connected to a device which is to be actuated,

a fixed member having a second profiled portion which cooperates with said first profiled portion when said second member occupies said second axial end position, said fixed member surrounds at least locally the screw-and-nut system, at least one of the two profiled portions having the shape of a bayonet joint oriented so as to prevent the second member, when it reaches the said second axial end position, from turning in a direction corresponding to that of the driving shaft and said first member and from moving away axially from this second end position when said intermediate member is pulled out and said motor does not rotate,

said bayonet joint having an outer side and an inner side, said

outer side capable of serving as a stop and as a guide to said first profiled portion, until the latter penetrates an entrance into the bayonet joint, the said other profiled portion being arranged for sliding over the outer side of the bayonet joint.

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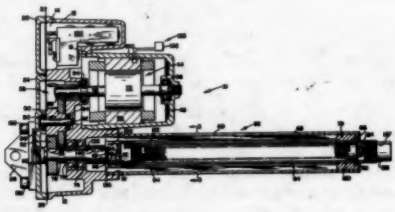
4,712,441

## POSITION CONTROLLED LINEAR ACTUATOR

William F. Abraham, Lancaster, N.Y., assignor to Brunswick Valve & Control, Inc., Houston, Tex.

Filed May 13, 1985, Ser. No. 733,633
Int. Cl.[4] F16H *25/20*
U.S. Cl. 74—89.15 26 Claims



12. A linear actuator comprising:

a housing;

a drive screw rotatably supported within said housing;

a drive nut in threaded engagement with said drive screw;

a body tube assembly connected to said housing and positioned about said drive screw, said body tube assembly containing reaction surfaces for preventing rotation of said drive nut;

an extendable member having a load connecting member on its free end and having the opposite end connected to said drive nut, said extendable member adapted for axial movement so as to extend out of said body tube;

drive means including an electric drive motor containing windings for rotating said drive screw; and

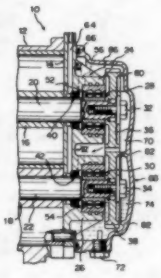
an overload controller means having a thermal sensing element located in the windings of said electric motor, said controller means operable for interrupting power to said electric motor upon heat up of said motor windings beyond a predetermined temperature, and wherein a back stop means is attached to the inner end of said drive screw and a mating back stop reaction means is provided on the innermost portion of said drive nut, and wherein a front stop means is attached to said drive screw at its outer end and a mating front stop reaction means is provided on the outer portion of said drive nut, said front and back stop means preventing further axial motion of said drive nut to heat up said motor windings and interrupt power to said drive motor through operation of said overload controller means; said back stop means and mating back stop reaction means and said front stop means and mating front stop reaction means each being structured to have a safety gap formed axially therebetween to prevent jamming between the drive nut and the front or back stop means, the interior surfaces of said body tube assembly and the exterior surfaces of said drive nut configured to provide said reaction surfaces within said body tube assembly at least at corner portions of said drive nut and to provide open spaces between the outer surfaces of said drive nut and the interior surfaces of said body tube assembly other than at said reaction surfaces, substantially each corner portion having plural surfaces engaging corresponding reaction surfaces of the body tube assembly.

4,712,442

## LUBRICATING MECHANISM FOR A ROTARY MACHINE

Toyokazu Baika, and Hidemi Oonaka, both of Susono, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed May 29, 1986, Ser. No. 868,089
Claims priority, application Japan, Jul. 31, 1985, 60-116417[U]
Int. Cl.[4] F16H *57/04;* F16N *1/00, 7/14*
U.S. Cl. 74—467 6 Claims



1. A rotary machine having a housing, comprising:

an upper and a lower shaft journaled in the housing at respective bearings, said shafts being parallel with each other and vertically spaced from each other, each of the shafts having an end extending outward beyond the housing;

an upper and a lower gear respectively secured to said shaft ends for rotation therewith, said gears being in mesh with each other to cause the shafts to rotate in a synchronized relationship;

a cover secured to the housing to define a sealed chamber for surrounding the gears and storing a quantity of lubricant sufficient to immerse a part of the lower gear, the teeth of said lower gear entraining said lubricant upon immersion therein;

a pair of oil seal members respectively disposed around the shafts, sealing the shafts to prevent the lubricant from entering inside the housing, said oil seal members being located adjacent to the bearings between said bearings and said housing;

a lubricating mechanism for supplying the lubricant transferred upward by the gears to the oil seal member and the bearing associated with the upper shaft;

a lubricant passage in said lubricating mechanism formed through a boss in the housing having an outlet opening between the bearing and the oil seal member associated with the upper shaft, and an inlet located at a level higher than that of the outlet and opening into the upper part of the sealed chamber; and

guiding means arranged with said upper and lower gears for positively guiding the lubricant entrained by the teeth of said upper and lower gears while said lubricant is transferred from the bottom of said lower gear to the top of said upper gear, said guiding means being arranged to substantially prevent the lubricant entrained by said teeth from spilling off said teeth in directions radially inwardly and outwardly of the respective gears during said lubrication transfer.

**4,712,443**

## MECHANICAL OVER-RIDE LINKAGES

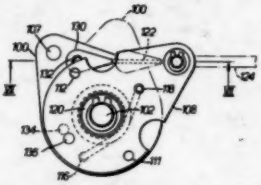
**Norman P. Deane, Rugby, England, assignor to AE PLC, Warwickshire, England**

**Filed Dec. 10, 1985, Ser. No. 806,803**

**Claims priority, application United Kingdom, Dec. 13, 1984, 8431455**

**Int. Cl.[4] G05G *1/14, 11/00***

**U.S. Cl. 74—470** **10 Claims**



1. A mechanism for fitting between a fuel supply control of an engine and an operator's control which is movable by an operator to control the fuel supply to the engine by means of said fuel supply control, the mechanism comprising first and second members pivotally secured together for relative pivotal movement,

the first member having means for connecting it to the said operator's control and the second member having means for connecting it to the fuel supply control,

spring means biasing the members together such that they tend to move as one in response to movement of the operator's control which varies the engine's fuel supply via the said fuel supply control, and

over-ride means connected between said first and second, said over-ride means comprising a cable movable within a casing, said cable being connected to one of said members and said casing being connected to the other of said members, said over-ride means being capable of applying a force between the members in response to an engine speed controlling signal, the force acting in opposition to said spring means and moving said second member relative to the first member to cause said fuel supply control to reduce the engine's fuel supply independently of the operator's control, the force being applied such that it acts simultaneously but in opposite directions on said first and second members whereby the force is not transmitted to the operator's control in the direction opposing a force exerted thereby which increases the engine's fuel supply.

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**4,712,444**

## LEVERED OPTICAL MOUNT

**Lindon L. Lewis, Boulder, Colo., assignor to Ball Corporation, Muncie, Ind.**

**Filed Sep. 16, 1986, Ser. No. 907,780**

**Int. Cl.[4] G05G *11/00;* G02B *5/08;* F16M *11/12***

**U.S. Cl. 74—479** **21 Claims**

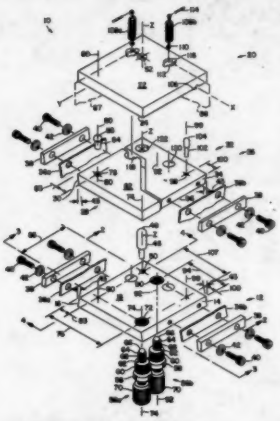
1. A mounting device (**10**) for precisely adjusting the inclination of one (**20**) of the parts thereof with respect to two axes (X and Y), which device comprises:

a first part (**20**);

a second part (**12**);

means (**46,48,** and **52**) for spacing said first part from said second part, for pivotally attaching said first part to said second part, for permitting said first part to pivot around intersecting X and Y axes, and for locating said intersection of said X and Y axes along a Z axis with respect to said second part;

first inclination adjusting means, comprising a first lever (**28**) that is flexibly attached to one (**12**) of said parts by a flexible metal hinge (**36***a*), for receiving a first angular adjustment, and for rotating said first part around said X axis by a first inclination angle that is smaller than said first angular adjustment; and



second inclination adjusting means, for receiving a second angular adjustment, and for rotating said first part around said Y axis by a second inclination angle that is smaller than said second angular adjustment.

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**4,712,445**

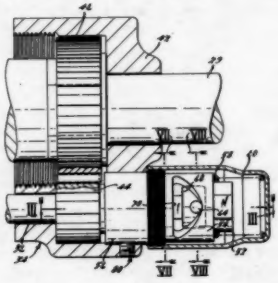
## ADJUSTING MECHANISM FOR TRACTOR LINKAGE

**Charles A. Hansen, Troy, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed May 23, 1986, Ser. No. 866,623**

**Int. Cl.[4] G05G *1/00;* F16D *57/10***

**U.S. Cl. 74—491** **4 Claims**



1. In an agricultural tractor of the type having a frame, a tractor cab mounted on the frame, a trailing arm hitch link pivotally mounted on a portion of the frame and a telescoping link assembly mounted on portions of the frame and the trailing link and having a drive gear carried in a housing for effecting telescoping movement to pivotally adjust the trailing link an improved adjusting mechanism comprising:

crank means mounted in the tractor cab;

shaft means rotatively driven by the crank means; and

locking and unlocking adjusting means carried in the drive gear housing in driving relationship with the drive gear and engaged with the shaft means to be rotatable with the shaft means in response to rotation of the crank means, portions of the adjusting means being arranged in a locked position to prevent more than certain limited movement of the drive gear in response to movement of the trailing link, and including lost motion means for permitting driving

movement of the drive gear upon certain rotation of the shaft means by moving the adjusting means portions to an unlocked position permitting such movement.

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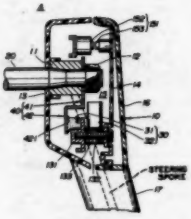
**4,712,446**

## ANTI-VIBRATION STRUCTURE OF A STEERING ARRANGEMENT

**Mitsuo Kamata, Chigasaki, and Yutaka Yamashita, Hiratsuka, both of Japan, assignors to Nissan Shatai Company, Limited, Kanagawa, Japan**

**Filed Jan. 21, 1986, Ser. No. 820,001**
**Claims priority, application Japan, Aug. 9, 1985, 60-175242**
**Int. Cl.[4] B62D *1/04***
**U.S. Cl. 74—492** **8 Claims**



**1.** An anti-vibration structure of a steering arrangement for a vehicle, comprising:

(a) a shaft housing having an inner space defined by a lower cover attached to an upper end of a steering shaft and an upper cover resiliently supported on the lower cover and formed on a center part of a steering wheel attached to an upper end of the steering shaft via the lower cover of the steering wheel;

(b) a mounting bracket housed within said shaft housing and having at least two parts, one part being formed with a fixing surface which is fixed to the upper part of the steering shaft, the other part being formed with a mounting surface substantially in parallel to the fixing surface of the one part, the mounting surface being positioned eccentrically with respect to an axis center of the steering shaft and nearer to the lower cover than the fixing surface, and both fixing surface and mounting surface forming a plane orthogonal to an axial direction of the steering shaft; and

(c) a dynamic damper including at least one elastic member and at least one mass member, housed within said shaft housing with one end of said elastic member fixed to said mounting surface so as to be in parallel to the axial direction of said steering shaft and the other end of said elastic member fixed to said mass member, for damping a vibration occurring on the steering wheel transmitted from said steering shaft regardlessly of a rotational angle and direction of the steering wheel.

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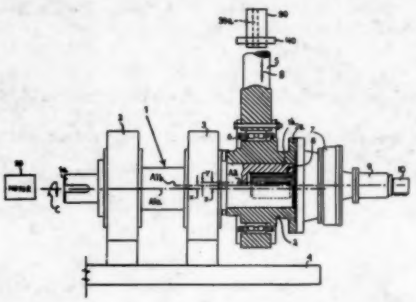
**4,712,447**

## OSCILLATOR FOR A CONTINUOUS CASTING MOLD

**Carl Langner, Monsey, N.Y., assignor to SMS Concast Inc., Montvale, N.J.**

**Filed Apr. 24, 1986, Ser. No. 855,883**
**Int. Cl.[4] G05G *3/00*; B22D *11/04***
**U.S. Cl. 74—571 R** **29 Claims**

**1.** An oscillator for a continuous casting mold, comprising a rotary drive shaft having a first portion, and a second portion which is eccentric with respect to said first portion; a first motor for driving said drive shaft; a sleeve surrounding and rotatable relative to said second portion, said sleeve being eccentric with respect to both of said portions and being designed to transmit oscillatory motion to a continuous casting mold as said drive shaft rotates; and a varying mechanism for changing the oscillation stroke while said drive shaft rotates and while said drive shaft is at a standstill, said varying mechanism including a second motor having an output element, and a supporting element for said output element, and said elements being rotatable relative to one another, one of said elements being coupled to said sleeve for rotation therewith, and said



sleeve being rotatable relative to the other of said elements so as to permit said second motor to rotate said sleeve relative to said second portion, said elements being at least approximately coaxial with said first portion.

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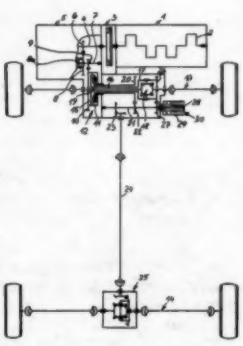
**4,712,448**

## DRIVE MECHANISM FOR MOTOR VEHICLES HAVING TWO DRIVE AXLES

**Heribert Lanzer, Gössendorf, Austria, assignor to Steyr-Daimler-Puch AG, Vienna, Austria**

**Filed Aug. 30, 1985, Ser. No. 772,128**
**Claims priority, application Austria, Aug. 30, 1984, 2781/84**
**Int. Cl.[4] F16H *37/08***
**U.S. Cl. 74—665 GC** **5 Claims**



**1.** A drive mechanism for a motor vehicle having first and second drive axles, comprising

a transmission drive,

a differential gear unit following said transmission drive, said differential gear unit including first and second driven members, said first driven member drivingly connected to said first drive axle and said second driven member drivingly connected to said second drive axle,

a self-contained fluid friction clutch unit positioned outside of said differential gear unit and drivingly arranged between said first and second drive members, said fluid friction clutch unit including first and second torque transferring elements coupled to each other by fluid friction coupling with a torque which depends on the differential speed of rotation of said elements, and

a gear system connecting said first driven member to said

first torque transferring element and said second driven member to said second torque transferring element,

said gear system being arranged so that said first and second torque transferring elements are rotated at a greater speed than said first and second driven members to enhance the coupling operation of said fluid friction clutch unit, and

said fluid friction clutch unit being removable.

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**4,712,449**

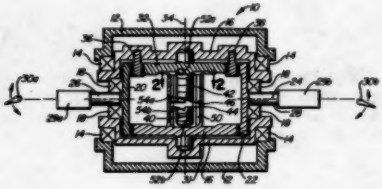
**APPARATUS FOR LIMITING DIFFERENTIAL ROTATION**

**Eli Avny, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.**

**Filed Sep. 18, 1986, Ser. No. 908,590**

**Int. Cl.[4] F16H *1/44***

**U.S. Cl. 74—710.5** **10 Claims**



1. An apparatus for limiting the relative rotation between two drive members, comprising:

first and second coaxial input gears driven by respective drive members;

a carrier adapted to rotate about the axis of the input gears;

a first stop gear carried by said carrier for rotation about an axis substantially perpendicular to the input gear axis, said first stop gear drivably engaging said first and second input gears;

a second stop gear coaxial with the first stop gear and rotatably carried by the carrier;

first and second idler gears disposed between the second stop gear and the first and second input gears respectively;

means for axially moving a traveling nut supported for axial movement between the first and second stop gears in response to differential rotation between the first and second stop gears; and

means for limiting axial motion of the nut when the drive members are at a selected limit of relative rotation.

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**4,712,450**

**STEPLESS SPEED CHANGE DEVICE**

**Kikuzo Takamiya, Kitamoto; Hideyuki Ishibashi, and Kunitoshi Kozakae, both of Ageo, all of Japan, assignors to Bridgestone Cycle Co., Ltd., Tokyo, Japan**

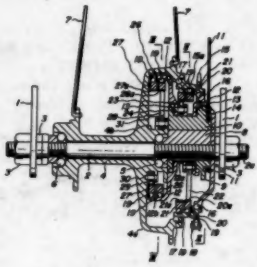
**Filed Feb. 3, 1986, Ser. No. 825,734**

**Claims priority, application Japan, Feb. 9, 1985, 60-22748; Feb. 14, 1985, 60-25280; Apr. 16, 1985, 60-79348**

**Int. Cl.[4] F16H *3/44***

**U.S. Cl. 74—750 B** **11 Claims**

1. A stepless speed change device comprising: first internally toothed ratchet rings arranged in plural rows side by side in an axial direction on an inner circumferential surface of a rotary member on an input side through one-way clutches interposed therebetween; an eccentric cam assembly whose eccentricity is adjustable; first pawls in plural rows to engage first ratchets provided in said first ratchet rings and having bottoms pivotally connected to a carrier rotatably in contact with said eccentric cam assembly, said bottoms of the first pawls in one row being between said bottoms of the first pawls in another of said plural rows; second internally toothed ratchet rings arranged in plural rows side by side in the axial direction on an inner circumferential surface of an annular portion formed integrally with said carrier through one-way clutches interposed therebetween; second pawls in plural rows to engage ratchets provided in said second ratchet rings and having bottoms pivotally



connected to a rotary member on an output side, said bottoms of the second pawls in one row being between said bottoms of the second pawls in another of said plural rows.

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**4,712,451**

**STARTER WITH A GEAR REDUCTION MECHANISM**

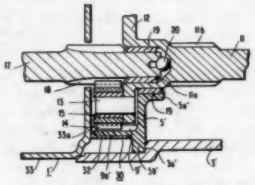
**Akira Morishita; Kyoichi Okamoto; Taiichi Nakagawa; Hiroyuki Morikane; Akinori Hasegawa; Takemi Arima, and Tadami Kounou, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 14, 1986, Ser. No. 818,633**

**Claims priority, application Japan, Jan. 18, 1985, 60-5799[U]**

**Int. Cl.[4] F02N *15/06*; F16H *1/32***

**U.S. Cl. 74—801** **10 Claims**



1. A gear reduction mechanism comprising:

a rotary shaft having a spur gear formed on an outer peripheral surface thereof;

a plurality of planet gears engaging said spur gear;

an output rotary shaft supporting said plurality of planet gears so as to cause rotation of said rotary shaft;

an internal ring gear formed of molded synthetic resin and having an intermediate bracket having a flange portion extending outwardly in the radial direction from said output rotary shaft, a cylindrical portion extending in the longitudinal direction with respect to said output rotary shaft, said flange portion acting as a cantilever for said cylindrical portion, and a toothed portion formed on an inner peripheral surface of said cylindrical portion, said plurality of planet gears engaging said toothed portion of said internal ring gear;

a front bracket into which said flange portion of said intermediate bracket is fitted so as to support said internal ring gear; and

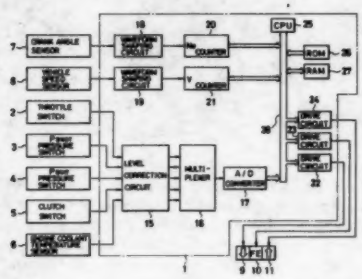
a reinforcing member comprising a material having a higher mechanical strength than said synthetic resin, said member being secured to the outer surface of said cylindrical portion.

4,712,452

## METHOD FOR DIRECTING AN UP-SHIFT OPERATION FOR A VEHICLE WITH A MANUAL TRANSMISSION

Yoshitaka Hibino, Utsunomiya, and Hiroshi Kogure, Tokorozawa, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 20, 1985, Ser. No. 778,054
Claims priority, application Japan, Sep. 28, 1984, 59-203279
Int. Cl.[4] B60K *41/06*
U.S. Cl. 74—866 3 Claims




1. In a method for directing an up-shift operation for a vehicle having an internal combustion engine and a manual transmission of at least three forward gear positions, including steps of detecting an opening angle of a throttle valve of said internal combustion engine, detecting a gear position of said manual transmission, detecting a vehicle speed, and generating a direction of an up-shift operation when said throttle valve is open, a medium speed gear of said manual transmission is engaged, and said vehicle speed is above a predetermined value, wherein the improvement comprises a step for detecting a high load range, a medium load range and a low load range of said internal combustion engine, said low load range being between said medium load range and a range in which the throttle valve is fully closed, said high load range being between said medium load range and a range in which the throttle valve is fully open, a step for stopping the generation of said direction of up-shift operation when the load of the internal combustion engine is in the medium load range, and a step for immediately directing an up-shift operation when the load of the internal combustion engine is in the low load range or is changed from the high load range to the low load range, in which said stop of the generation of the direction of up-shifting operation is cancelled when a predetermined time period has passed since the load of the internal combustion engine entered into the medium load range.

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4,712,453

## HYDRAULIC CONTROL SYSTEM FOR CONTINUOUSLY VARIABLE TRANSMISSION

William J. Haley, Sterling Heights, Mich., assignor to Borg-Warner Corporation, Chicago, Ill.

Continuation of Ser. No. 728,533, Apr. 29, 1985, abandoned, which is a continuation of Ser. No. 421,198, Sep. 22, 1982, abandoned. This application Feb. 24, 1986, Ser. No. 832,208
Int. Cl.[4] B60K *41/18*
U.S. Cl. 74—866 19 Claims

14. A control arrangement for a continuously variable transmission in which torque is transferred from an engine to a primary pulley, having an axially fixed sheave and an axially movable sheave with a chamber for admitting and discharging fluid to regulate the effective primary pulley diameter, a secondary pulley having an axially fixed sheave and an axially movable sheave with a chamber for admitting and discharging fluid, a belt intercoupling the first and second pulleys, the tension in the belt being maintained by the fluid pressure in the secondary pulley chamber, a starting clutch including a chamber for admitting and discharging fluid to regulate the transfer of drive torque from the secondary pulley through an associated vehicle drivetrain, an electronic control system connected to receive a plurality of information signals and to provide at least two output signals, and a hydraulic control system, connected to receive the output signals from the electronic control system and to regulate fluid under pressure individually applied to the primary pulley chamber, the secondary pulley chamber, and the starting clutch chamber, in which the hydraulic control system is characterized by

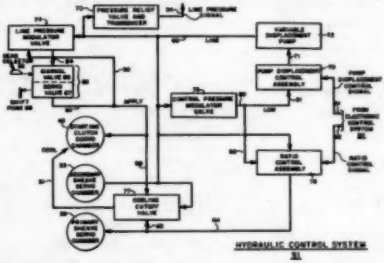
a main line connected to supply fluid under pressure to the secondary pulley movable sheave chamber,

a variable displacement pump connected to supply fluid under pressure to said main line,

a control line,

means, including a modulator valve coupled to said main line, for establishing a fluid pressure in said control line which is substantially constant and approximately equal to the lowest pressure in said main line,

means, including a pump displacement control assembly coupled between said control line and said variable displacement pump, for regulating the pressure in said main line,




a transducer, coupled to said main line, for providing an electrical signal which varies as a function of the pressure in said main line, said pump displacement control assembly comprising a fluid control valve for providing a regulating signal to said variable displacement pump,

means, including a solenoid valve coupled between said fluid control valve and said transducer, for regulating operation of the variable displacement pump as a function of the signal provided by the transducer, and

a ratio control assembly, coupled between said main line and the primary pulley movable sheave chamber, for controlling the flow of fluid into and out of the primary pulley movable sheave chamber to regulate the ratio of the continuously variable transmission, and further comprising a cooling cutoff valve, coupled between said main line and said starting clutch, for providing a flow of cooling oil to the starting clutch when the cooling cutoff valve is in the appropriate position.

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4,712,454

## LIFT-TAB CONTAINER OPENER

Alan Hull, Apt. 601 600 9th Ave., Seattle, Wash. 98104, and Michael J. Yates, 2617 NE. 22nd St., Renton, Wash. 98056

Filed Aug. 18, 1986, Ser. No. 897,658
Int. Cl.[4] B67B *7/40*
U.S. Cl. 81—3.27 13 Claims

1. Apparatus attachable to a support surface and enabling opening a lift-tab container with only one hand, said container having a top surface and a lift tab attached to said top, said container being openable by lifting of said tab, said apparatus comprising:

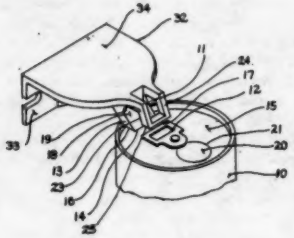
a base,

first means for lifting said lift tab,

second means for depressing said lift tab,

structural means supporting said first and second means from said base,

said first means being oriented such that with said top surface placed in contact with said first means and said container moved toward said base, said lift tab is lifted,



said second means being oriented such that when said container is moved away from said base, said lift tab is depressed,

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**4,712,455**

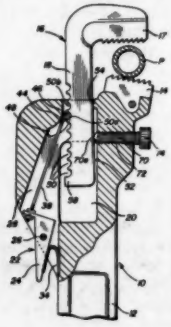
**SLIDING JAW WRENCH**

**Terrence D. Cox, P.O. Box 222, Olney, Ill. 62450**

**Continuation-in-part of Ser. No. 622,622, Jun. 20, 1984, Pat. No. 4,580,468. This application Mar. 3, 1986, Ser. No. 835,260**

**Int. Cl.[4] B25B** *13/14, 13/18*

**U.S. Cl. 81—141** **9 Claims**



1. A sliding jaw wrench comprising a wrench handle, a stationary jaw on the handle, a movable jaw having an elongate shank extending therefrom, the shank being mounted for movement in a pocket formed in the handle to adjust the degree of opening of the jaws, means for providing incremental movement of the shank relative to the handle for incrementally adjusting the spacing between the jaws, means for releasably retaining the shank in selected incrementally adjusted positions relative to the handle, means permitting a degree of rocking movement of the shank in said pocket in said incrementally adjusted positions, and fine adjustment associated with the handle for selectively taking up slack in the movable jaw by moving the movable jaw toward the stationary jaw and reducing the amount of rocking movement available to the shank in said adjusted positions.

**4,712,456**

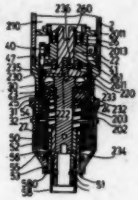
**ELECTRIC TORSION-CONTROLLED SCREWDRIVER WITH AN IMPROVED AUTOMATIC TURN-OFF DEVICE**

**Lo J. Yuan, Yung Ho City, Taiwan, assignor to Top Driver Enterprise Co., Ltd., Taipei Hsien, Taiwan**

**Filed Jul. 2, 1986, Ser. No. 881,364**

**Int. Cl.[4] B25B** *23/157*

**U.S. Cl. 81—473** **14 Claims**



1. An electric screw driver having a hollow cylindrical housing, a driving means, an electric circuit with power source for controlling said driving means and a reducing gear mechanism which are provided in said cylindrical housing, a handle switch for turning on said driving means provided at an upper portion of said hollow cylindrical housing, and an improved automatic turn-off device comprising:

a clutch mechanism driven by said driving means including a clutch housing with a head portion, an inner annular flange portion provided at a bottom opening thereof and an outer threaded surface, an upper clutch member with a base flange portion and a bottom hollow portion, firmly received in said clutch housing and a lower clutch member with an upper extending portion which is received in said bottom hollow portion of said upper clutch member; wherein: said head portion of said clutch housing further includes an upper flange portion with a screw hole for fixing said clutch housing to said hollow cylindrical housing through a screw, and said upper clutch member further has a substantially triangular-shaped cam protrusion extending from the bottom surface of said base flange portion which has two arcs with different curvatures, and said lower clutch member has an annular flange portion provided between said lower clutch member and its upper extending portion, a hole and a ball member are provided on said annular flange portion of said lower clutch member and said ball can be received in said hole once it is moved into said hole by said cam protrusion, a sleeve member movably sleeves on said lower clutch and a bearing ring is movably sleeved and retained on said sleeve member;

a switch device for short circuiting said driving means to turn off automatically said driving means, adapted to connect with said electric circuit, which is provided on said head portion of said clutch housing;

means for supporting said switch device received in said clutch housing and provided around said upper and lower clutch member for controlling said switch device to short circuit said driving means;

a cylindrical cover member with a bottom opening and an inner threaded surface threaded on said outer threaded surface of said clutch housing for covering said lower clutch member, wherein an inner flange portion is provided at said bottom opening of said cylindrical cover;

a torsion spring member retained between said clutch housing and said cylindrical cover member and sleeved on said lower clutch member, and disposed on said inner flange portion of said cylindrical cover member for supporting and biasing said bearing ring and said sleeve member of said lower clutch member; and

a socket member adapted to receive different kinds of screwdrivers or box spanners, and inserted into said cylindrical cover member through said bottom opening of said cylin-

drical cover member and fixed to said lower clutch member;

whereby, said electric screwdriver can tighten or unfasten a screw or a nut on a workpiece if said electric screwdriver is switched on through said handle switch as said driving means drives said clutch mechanism, and said substantially trangular protrusion of said upper clutch member may move said ball into said hole of said lower clutch member when said clutch member is stopped rotating if said screw or nut is tightened tightly, and said ball can press down said sleeve member through said hole so that said switch device supporting means is pressed down by said bearing ring and disengaged from said switch device, whereby said driving means is short circuited and stopped from working even though said handle switch is turned on.

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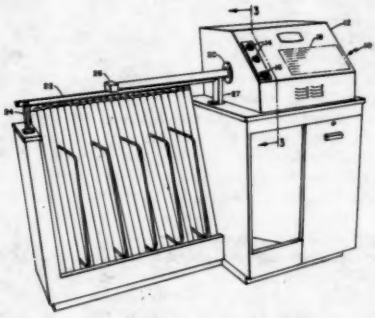
**4,712,457**

## APPARATUS AND METHOD FOR CUTTING WINDOW SHADES

**Glenn S. Percivalle, Warwick, and Ronald L. Blanchette, Johnston, both of R.I., assignors to Kenney Manufacturing Company, Warwick, R.I.**

**Filed Jun. 20, 1986, Ser. No. 876,928**
**Int. Cl.[4] B23B** *3/26, 5/14*
**U.S. Cl. 82—47** **5 Claims**



1. A device for automatically cutting window shades mounted on a roller, comprising:

base means supporting the operative components of said device at a convenient working level;

means, supported from said base means, for cutting the shade, which means comprises:

a wheel having two lateral faces and walls centrally defining an opening on the rotational axis thereof, and mounting blocks disposed on opposite sides of said opening;

parallel shafts extending slidably through said mounting blocks;

cutting blade means mounted on said parallel shafts on one side of the rotational axis of the wheel for radial movement relative thereto;

means for drawing the cutting blade means toward the rotational axis of the wheel, said drawing means comprising a weight mounted on said shafts adjacent the ends thereof disposed on the opposite side of the axis of rotation of said wheel from said cutting blade means; whereby when said wheel rotates, centrifugal force acting on the weight draws the cutting blade toward the rotational axis of the wheel;

means for restraining radial movement of the cutting blade toward the rotational axis of the wheel, comprising spring means acting against the centrifugal force and the weight so as to urge the cutting blade away from the rotational axis of the wheel when the wheel is rotating at less than a predetermined speed;

means, supported from said base means, and operatively connected to said wheel, for driving said wheel;

means, mounted on said base means, for mounting the roller and shade concentrically to said wheel within said opening along the axis of rotation thereof and for stabilizing said roller and shade during the cutting operation at a predetermined point along said shade and roller;

first means for interrupting the operation of the cutting means responsive to contact by the cutting blade means with a metal shade roller, comprising means for disengaging said drive means, and time delay means adapted to defer the operation of said disengaging means until the cutting means shall have completed one additional revolution around the roller;

second means for interrupting the operation of the cutting means responsive to a predetermined radial movement of said cutting blade means, said second means comprising proximity sensing means mounted on said weight and on the support of said cutting device adapted to detect when said weight has travelled a predetermined distance, and to activate said means for disengaging said drive means in response to such a detection.

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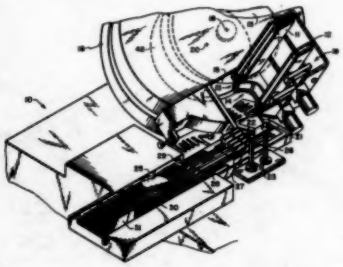
**4,712,458**

## FOOD LOAF SLICING MACHINE WITH IMPROVED STACKING CHARACTERISTICS

**Timothy G. Mally, Oregon, Wis., assignor to Oscar Mayer Foods Corporation, Madison, Wis.**

**Filed Dec. 11, 1986, Ser. No. 940,697**
**Int. Cl.[4] B26D** *7/06, 5/20*
**U.S. Cl. 83—86** **11 Claims**



1. In a high volume food loaf slicing machine of the kind comprising: a loaf support, supporting a food loaf for movement along a downwardly inclined path;

loaf feed conveyor means, positioned at the lower end of the food loaf path, for continuously advancing a food loaf along that path and into a slicing station;

a rotary knife, supported for orbital movement into and out of the slicing station in a direction transverse to the food loaf path, for cyclically cutting individual slices from the loaf as the loaf enters the slicing station, and contained within a blade housing wherein said blade housing comprises upper and lower blade housings;

variable speed main drive motor means;

knife orbit drive connection means, connecting the main drive motor means to the knife to drive the knife through its orbital movement at a slicing rate determined by the speed of the main drive motor means;

conveyor drive connection means, connecting the main drive motor means to the loaf feed conveyor means to drive the conveyor means at a loaf feed rate determined in part by the speed of the main drive motor means;

variable speed knife rotation motor means, connected to the knife to drive the knife through its rotary motion at a cutting rate determined by the speed of the knife rotation motor means and independent of the speed of the main drive motor means;

and a sliced food stacker comprising two pair of stacker grids mounted on vertically movable rotatable support shafts, said stacker located immediately below the slicing station.

the improvement comprising;

a large air baffle forming a substantially continuous wall adjacent to the open area of the lower blade housing, said lower housing bounding said large baffle on its ends and bottom, said large baffle bounded on its top by the rotating knife blade as it rotates over it;

a small air baffle mounted on the lower blade housing perpendicular to the plane of the knife blade and radially from the rotary knife orbiter, said small baffle bounded on its bottom and one end by the lower blade housing and on its other end by the rotating blade orbiter and on top by the rotating blade;

and a vent port formed in the lower blade housing wherein said port is sufficiently sized and shaped to allow turbulent air generated by the rotating knife blade to flow down and out of the blade housing rather than over the product to be sliced.

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**4,712,459**

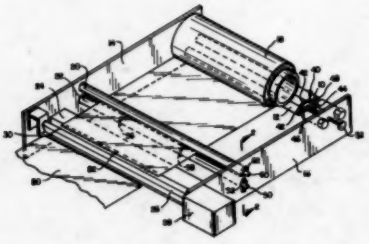
## APPARATUS FOR SEVERING WRAPPING FILM

**Zigmunt J. Walkiewicz, Jr., Chagrin Falls, and William C. Lynch, Brecksville, both of Ohio, assignors to Clamco Corporation, Cleveland, Ohio**

**Filed May 1, 1986, Ser. No. 858,447**

**Int. Cl.[4] B65H *59/02*; B26D *7/10***

**U.S. Cl. 83—171** **9 Claims**



1. Apparatus for severing sheets of film from a roll of plastic film, comprising:

means for supporting a said roll as it rotates about its axis of rotation while film is being withdrawn from said roll;

means for applying braking force to said roll so that said film is under tension as it is being withdrawn from said roll;

electrically heated cutoff means located forwardly of said roll for severing a sheet of film from said roll as a length of film is withdrawn under tension from said roll and then brought into contact with said cutoff means; and,

a pair of pinch rollers extending transversely of the path of said film and located intermediate said roll support means and said cutoff means for guiding movement of said film between said rollers from said roll to said cutoff means, one-way clutch means associated with at least one of said rollers for permitting forward movement of said film therebetween toward said cutoff means while restricting backward movement toward said roll, resulting from the severing of a said sheet, by a controlled amount sufficient to ensure that the leading edge of the remaining film moves off and away from said heated cut off means sufficient to prevent melting of said film while at the same time preventing said film from backing up by an amount to cause said film to bunch up on or gather on said roll.

**4,712,460**

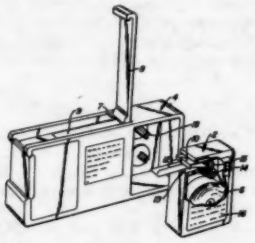
## INTEGRATED DRUG DOSAGE FORM AND METERING SYSTEM

**Jimmy D. Allen, Los Altos; Michael E. Cobb, San Jose; Robert S. Hillman, Cupertino; Dennis R. Mungall, Redwood City; Vladimir E. Ostoich, San Jose, and Gary H. Stroy, Los Altos, all of Calif., assignors to Biotrack, Inc., Mt. View, Calif.**

**Filed Nov. 18, 1985, Ser. No. 798,780**

**Int. Cl.[4] B65D *83/00***

**U.S. Cl. 83—208** **25 Claims**



1. A drug tape dispenser for adjustably dispensing preselected single dosage lengths of drug tape from a drug tape supply, comprising:

a portable housing having a dispenser site and a cassette receptacle site;

a cassette adapted for removably engaging the housing at the cassette receptacle site;

drive means in the housing at the cassette receptacle site;

feed means disposed in said cassette to receive and engage the drug tape from the drug tape supply when the feed means is operably engaged by said drive means when said cassette engages the housing at the cassette receptacle site;

a first discharge site in said housing located to introduce said tape into said dispenser site;

a second discharge site located in said cassette so as to mate with the first discharge site when said cassette engages the housing at the cassette receptacle site;

a controller coordinately actuating the drive means for automatically measuring a single dosage length of drug tape; and

a cutter disposed proximate to the first discharge site to sever the single dosage length from the supply of drug tape.

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**4,712,461**

## ROLLED MATERIAL DISPENSER WITH FEED ROLLER CONTAINING A SLIDING CUTTER

**Holger Rasmussen, Kilchberg, Switzerland, assignor to Georgia-Pacific Corporation, Atlanta, Ga.**

**Filed Oct. 18, 1985, Ser. No. 788,837**

**Int. Cl.[4] A47K *10/36*; B26D *1/56*; B26F *3/02***

**U.S. Cl. 83—334** **5 Claims**

1. A dispenser for rolls of flexible sheet material comprising:

a chassis adapted to be attached to a wall;

means carried by said chassis for rotatably supporting a roll of flexible sheet material;

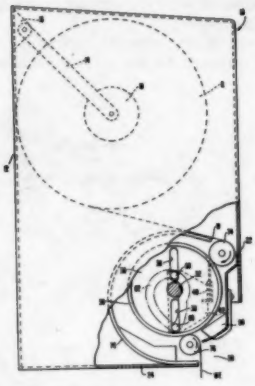
a feed roller rotatably mounted on said chassis for guiding a web of sheet material from the roll to a position to be grasped by a user so that the user may pull the web out of the dispenser, said feed roller having aperture means formed longitudinally in the periphery thereof;

carrier means within said feed roller having a cutting blade mounted thereon and cam followers extending beyond the opposite ends of said feed roller, said blade having a cutting edge;

means mounting said carrier means in said feed roller for movement of said cutting blade in a flat plane along a

linear path parallel to and laterally offset from a radius of said feed roller; and

means including statinary cams mounted on said chassis adjacent the ends of said feed roller, respectively, said cam



followers being engaged with said stationary cams to move said blade in said path projecting said cutting edge beyond said feed roller periphery through said aperture means to cut the web and retracting said edge as said feed roller rotates.

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**4,712,462**

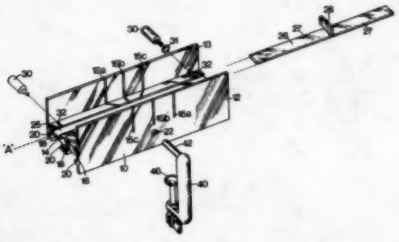
**MODELMAKER'S MITER JIG**

**Sava Cvek, 9 Charlesbank Rd., Newton, Mass. 02158**

**Filed Dec. 19, 1985, Ser. No. 811,021**

**Int. Cl.[4] B27B *21/00***

**U.S. Cl. 83—762** **9 Claims**



1. A modelmaker's miter jig having a body comprising

a work support surface having a longitudinal axis,

a guide wall rising from the work support surface along the axis, and including

(i) means for guiding a saw at a selected angle across the axis over the work surface,

(ii) an alignment face for aligning the axis with the edge of a table top by abutting against such edge, and

(iii) a clamp engaging face for engaging and securing a c-clamp in a plane in a plane perpendicular to the axis whereby the miter jig may be fixedly secured to a table top by a said c-clamp, wherein the clamp engaging face is the inner surface of an opening formed in the guide wall, parallel to the work support surface, for engaging an arm of a c-clamp directed parallel to said work support surface.

**4,712,463**

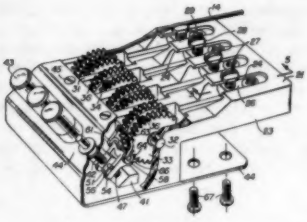
**BRIDGE AND TUNING MECHANISM FOR STRINGED INSTRUMENTS**

**Philip Kubicki, and Geoffrey Richardson, both of P.O. Box 40110, Santa Barbara, Calif. 93103**

**Filed Feb. 24, 1986, Ser. No. 831,868**

**Int. Cl.[4] G10D *3/14***

**U.S. Cl. 84—304** **9 Claims**



1. In an instrument having at least one string, a bridge comprising a frame an axle in said frame transverse to said string, a wheel rotatable on said axle and held against axial movement along said axle, first means securing said string to said wheel, said wheel having toothed second means whereby the user may rotate said wheel in one direction to tighten said string, third means engaging said second means to secure said wheel against return rotation, fourth means to render said third means inoperative, a knob, fifth means to convert turning of said knob to movement of said third means for very short angular movement of said wheel, a slider adjustably movable in said frame parallel to said string, a stop carried by said slider and sixth means to secure said slider in a position of adjustment, said string being contacted by said stop to limit effective vibrating length of said string.

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**4,712,464**

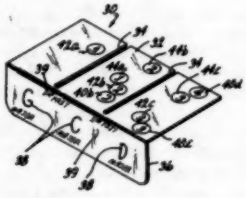
**STRINGED INSTRUMENT FINGER POSITIONING GUIDE**

**J. Kregg Nance, 1224 Ninth St., Santa Monica, Calif. 90401**

**Filed Oct. 31, 1985, Ser. No. 793,178**

**Int. Cl.[4] G10G *1/02***

**U.S. Cl. 84—485 R** **5 Claims**



1. For use with a conventional fretted stringed musical instrument having a plurality of strings extending along and spaced above a longitudinally extended fretted fingerboard section of the instrument, a finger position guide selectively manually attachable to and removable from the neck of the instrument without mechanical modification or alteration of the conventional instrument for indicating finger impingement positions for performing at least one predetermined musical chord, said guide comprising:

(a) a plate having a shape adapted to be removably inserted to a predetermined position beneath the strings and on top of the longitudinally extended fretted fingerboard section of the neck of the musical instrument, said plate being slotted with at least one slot to receive at least one fret

subtended thereby, so that said plate fits snugly on the fingerboard when inserted thereon and is laterally aligned and longitudinally positioned by the subtended frets;

(b) said plate having established on its surface a first plurality of colored spots of a first color, said first plurality of colored spots when said plate is inserted being positioned beneath the strings for indicating respectively corresponding finger impingement positions for playing a first musical chord; and,

(c) positioning means for laterally positioning said plate on said fingerboard comprising an appendage depending from only one side side of said plate and making a corner therewith, said appendage being adapted to abut the side of the fingerboard when said plate is inserted thereon to serve as a lateral positioning stop therefor wherein all slots of said slotted plate are closed at one side of said plate adjacent said depending appendage and are open to the side of said plate opposite said depending appendage.

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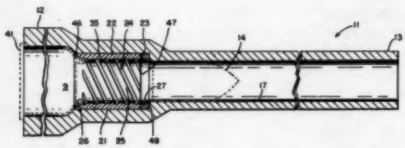
**4,712,465**

## DUAL PURPOSE GUN BARREL FOR SPIN STABILIZED OR FIN STABILIZED PROJECTILES AND GUN LAUNCHED ROCKETS

**Kenneth A. B. Macdonald, Maple Valley, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed Aug. 28, 1986, Ser. No. 901,486**
**Int. Cl.[4] F41F *17/06*; F42B *13/28***
**U.S. Cl. 89—16** **20 Claims**



1. A gun barrel and projectile round combination, comprising:

an elongated tube having a smooth central bore and defining a muzzle end and a breech end;

a hollow cylindrical insert retained within said breech end coaxial with said smooth central bore and having a plurality of helical grooves defining lands therebetween on the inner surface of said insert;

a projectile loaded in said breech end, extending from the breech facing end of said insert forward into said smooth central bore, said projectile having a thin sidewall surrounding a central cavity and being dimensioned in diameter to provide a close sliding fit within said smooth central bore, said projectile further defining a hollow base circumscribed by a skirt which includes a plurality of pressure equalizing ports for transmitting breech pressure from the base of said projectile to the region between said thin sidewall and said smooth central bore; and

a frangible film surrounding said projectile skirt closing said pressure equalizing ports.

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**4,712,466**

## SEMIAUTOMATIC OPERATION REVOLVING CYLINDER PISTOL

**Emilio Ghisoni, Via Villa Serafina, 4, 27100 Pavia, Italy**

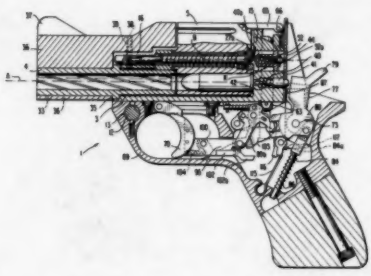
**Filed Feb. 13, 1986, Ser. No. 828,916**
**Claims priority, application Italy, Feb. 13, 1985, 19488 A/85**
**Int. Cl.[4] F41D *7/04***
**U.S. Cl. 89—157** **9 Claims**

1. A semiautomatic operation revolving cylinder pistol, comprising a frame containing a firing mechanism and a slide supporting the revolver barrel and cylinder, said slide being guided moveably on said frame between two mechanical stops and against the bias of spring means, characterized in that it comprises:

a housing formed on said slide and defining, rearwardly therein, a cylinder accommodating area;

a cylinder rotatably mounted in said area having a plurality of teeth disposed in an annular configuration on an end face of said cylinder;

pawl and ratchet means moveably mounted in said housing and being arranged to act on said teeth to rotate said cylinder;



a spring motor in said housing for actuating said pawl and ratchet means;

means for energizing said spring motor automatically by the recoil stroke of said slide on the frame each time a round is fired; and

pusher means moveable guided in said frame and being linked mechanically to said firing mechanism for acting on said spring motor to energize it.

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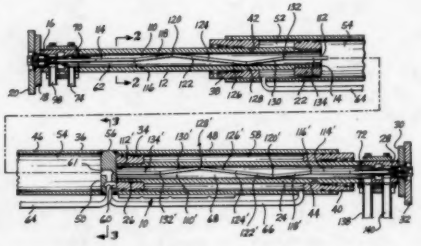
**4,712,467**

## COMBINED LINEAR HYDRAULIC MOTOR AND TRANSFER VALVE

**Raymond K. Foster, P.O. Box 1, Madras, Oreg. 97741**

**Filed Sep. 8, 1986, Ser. No. 905,098**
**Int. Cl.[4] F01B *15/00*; F15B *15/22***
**U.S. Cl. 91—176** **5 Claims**



1. A combined linear hydraulic motor and transfer valve, comprising:

a fixed first piston rod having inner and outer ends;

a fixed second piston rod having inner and outer ends;

a first piston head at the inner end of said first piston rod;

a second piston head at the inner end of said second piston rod;

said first and second piston heads being spaced apart when in use;

a cylinder housing mounted to travel on said first and second piston heads;

said cylinder housing having first and second end members;

said first end member including a central opening through which the first piston rod extends;

said second end member including a central opening through which the second piston rod extends;
said cylinder housing including a divider wall between its ends;
wherein a first fluid chamber is formed within said cylinder housing between said first end member and said first piston head;
wherein a second fluid chamber is formed within said cylinder housing between said first piston head and the divider wall;
wherein a third fluid chamber is formed within said cylinder housing between said divider wall and said second piston head;
wherein a fourth fluid chamber is formed within said cylinder housing between said second piston head and said second end member;
said divider wall including a first passageway having an inner end communicating with said third fluid chamber, and an outer end;
said divider wall also including a second passageway having an inner end communicating with said second fluid chamber, and an outer end;
first conduit means extending through said first piston rod and having an inner end in communication with said second fluid chamber, and an outer end;
second conduit means interconnected between said first fluid chamber and the outer end of the first passageway in said divider wall;
third conduit means interconnected between the outer end of the second passageway in said divider wall, and the fourth fluid chamber;
fourth conduit means extending through said second piston rod and having an inner end in communication with said third fluid chamber, and an outer end, a pair of spaced apart ports in sidewall portions of the second piston rod, adjacent its outer end, a transverse wall inside of said fourth conduit means positioned axially between the two ports, said transverse wall including a transfer port;
a valve plug member within said fourth conduit means axially outwardly of said transfer port, said valve plug member having a plug end portion directed towards said transfer port;
spring means endwise outwardly of said valve plug member, biasing said plug end portion into seated engagement with the transfer port; and
elongated operator rod means extending through said fourth conduit means, from said valve plug member to the inner end of said fourth conduit means, said actuator rod means having an inner end portion which projects into said third fluid chamber, into a position to be contacted by the divider wall when fluid is being removed from said third fluid chamber and said divider wall is moving toward said second piston head, with contact of the divider wall with the inner end of said rod pushing said rod endwise outwardly, and means responsive to such outward movement of the actuator rod for unseating said valve plug to open the transfer port and communicate each of the sidewall ports with the other, via the transfer port.

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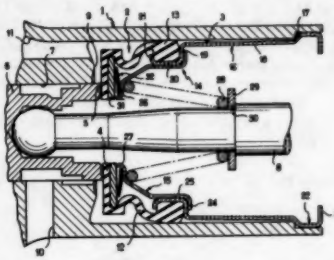
## 4,712,468
## DISTRIBUTION VALVE ASSEMBLY FOR A PNEUMATIC BRAKE BOOSTER

**Jean-Claude Blot, Louvres, France, assignor to Bendix France, Paris, France**

**Filed Sep. 12, 1986, Ser. No. 907,551**
**Claims priority, application France, Sep. 30, 1985, 85 14453**
**Int. Cl.[4] F15B 9/10**
**U.S. Cl. 91—376 R** **10 Claims**

1. A distribution valve assembly for a pneumatic brake booster, comprising, inside a tubular hub of a booster piston, a resilient valve member associated with a valve-member support and comprising an annular active part cooperating selectively with two concentric valve seats formed in the hub, an external mounting part sealingly arranged between an internal wall of a tubular hub and said valve-member support mounted in the tubular hub, a rod-return spring between said valve-member support and a bearing surface on an input rod, and a valve spring between said valve-member support and said active part of said valve-member so as to bias said active part in a direction toward said valve seat, and a valve plunger sliding inside the hub and coupled to the input rod of the



booster, characterized in that said valve-member support has an internal end zone extending radially inwardly adjacent said active part of said valve-member and forming a bearing surface for the valve spring which consists of a resilient washer formed by an annular revolution that minimizes the axial dimension thereof, and the rod return spring bearing against the internal end zone of said valve-member support to bias the internal end zone into engagement with the washer.

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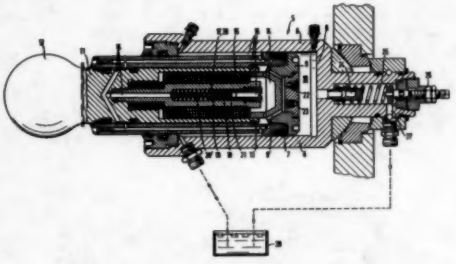
## 4,712,469
## CHAIN TENSIONING DEVICE

**Hans Hesse, Munich, Fed. Rep. of Germany, assignor to Krauss-Maffei A.G., Fed. Rep. of Germany**

**Filed Oct. 19, 1984, Ser. No. 662,637**
**Claims priority, application Fed. Rep. of Germany, Oct. 21, 1983, 3338313**
**Int. Cl.[4] B62D 55/30**
**U.S. Cl. 91—422** **20 Claims**



1. A hydraulic tensioning device comprising:
cylinder means for housing;
means, associated with said cylinder means, for fixing said cylinder means;
tappet means for coupling said tensioning device to an apparatus to be tensioned;
means for translating vibrational forces transmitted to said tappet means into a tensioning force tending to extend said tappet means, located within said means for housing: including
a piston assembly arranged within said cylinder exhibiting a piston base defining a primary cylinder chamber;
a tappet piston arranged within said piston assembly and defining an auxiliary cylinder chamber; means for drawing hydraulic fluid into said auxiliary cylinder chamber and pumping said hydraulic fluid into said primary cylinder chamber upon reciprocation of said tappet

piston, located within said piston assembly; and means for limiting said tensioning force by idling said means for drawing, upon attainment of a predetermined pressure in said auxiliary cylinder chamber.

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**4,712,470**

## METHOD AND APPARATUS FOR COMPENSATING THE VARIABLE WEIGHT OF A MASS ACTING ON A HYDRAULIC DRIVE, IN PARTICULAR FOR THE UPRIGHT DRIVE CYLINDER OF A LAPPING MACHINE

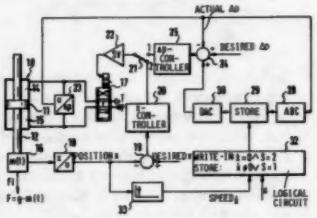
**Jürgen Schmitz, Marktheidenfeld, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Fed. Rep. of Germany**

**Filed Jan. 7, 1987, Ser. No. 1,017**

**Claims priority, application Fed. Rep. of Germany, Jan. 9, 1986, 3600364**

**Int. Cl.⁴ F15B *11/10***

**U.S. Cl. 91—433** **10 Claims**




1. Method for compensating the variable weight of a mass acting on a hydraulic drive, in particular for the upright drive cylinder of a lapping machine, comprising a pressure pickup and a pressure regulator for driving a directional valve setting the pressure exerted by the drive, characterized in that when the mass is held in suspension without support the pressure set at the drive is measured and in the subsequent pressure regulation the pressure value is supplied to the pressure regulator as compensation parameter.

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**4,712,471**

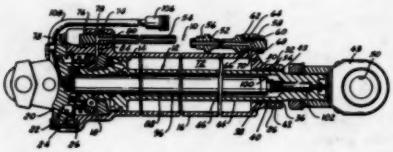
## ACTUATOR LOCKING MECHANISM

**D. Dale Johnson, Mt. Clemens, Mich., assignor to Ex-Cell-O Corporation, Walled Lake, Mich.**

**Filed Aug. 29, 1986, Ser. No. 901,720**

**Int. Cl.⁴ F15B *15/22***

**U.S. Cl. 92—24** **5 Claims**



1. In a hydraulic actuator having an actuator cylinder with an actuator head and locking mechanism for locking a main ram in a retracted position, the impovement comprising: first and second slideable sleeve means, extension means on the actuator head extending axially inwardly of the actuator cylinder in telescoping relationship with said first and second sleeve means for slidably supporting said first and second sleeve means in a sliding referenced relationship on the actuator head at one end of the actuator cylinder;

said first sleeve means having a release position and an axially spaced locking position;

a plurality of moveable locking jaws located at the end of said extension at circumferentially spaced locations thereabout, spring means connecting each of said locking jaws one to the other to spring bias said locking jaws radially outwardly into a release position;

each of said locking jaws having a first surface thereon including a load contact surface thereon;

said first sleeve means having a surface thereon selectively engageable with the load contact surface along a line of contact on each of said locking jaws to move the locking jaws into a locked position wherein the spring means are compressed;

each of said locking jaws having a second surface thereon that engages the main ram to hold it in a locked retracted position.

said main ram including an inboard end;

said inboard end engageable with said second sleeve means and operative to jam it into contact with the actuator head to eliminate all backlash between the main ram and the cylinder.

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**4,712,472**

## METHOD OF AND APPARATUS FOR ALTERING THE MOISTURE CONTENT OF RUNNING WEBS

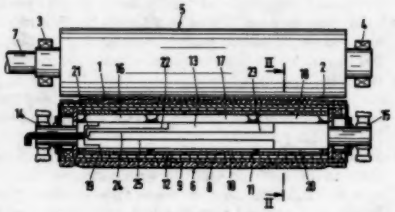
**Klaus Meisen, Tönisvorst, and Peter Towes, Anrath, both of Fed. Rep. of Germany, assignors to Kleinewefers Textilmaschinen GmbH, Krefeld, Fed. Rep. of Germany**

**Filed Sep. 30, 1986, Ser. No. 913,533**

**Claims priority, application Fed. Rep. of Germany, Oct. 4, 1985, 3535458**

**Int. Cl.⁴ B30B *3/04, 15/16***

**U.S. Cl. 100—37** **20 Claims**



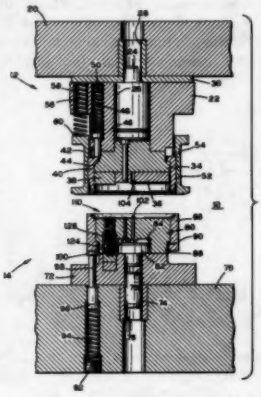
1. A method of altering the moisture content of a running web of textile or like material in the elongated nip of two squeezing rollers at least one of which is deformable so as to allow for changes in the width of the nip, comprising the steps of monitoring the moisture content of a plurality of web portions which are spaced apart from each other in the longitudinal direction of the nip and each of which is in line with a different portion of the one roller; individually biasing said portions of the one roller toward the other of the rollers so as to exert pressure upon the corresponding portions of the web; comparing the monitored moisture content with predetermined reference values and generating signals denoting deviations of monitored moisture content from the respective reference values; reducing the bias upon a selected portion of the one roller, with attendant increase in the moisture content of the corresponding portion of the web, when the respective signal denotes insufficient moisture content; and biasing the selected portion of the one roller away from the other roller by increasing the pressure upon a further selected portion of said roller substantially on the opposite side of said selected portion when the bias upon the selected portion is reduced to zero but the moisture content of the corresponding portion of the web is still below that which is denoted by the respective reference signal.

4,712,473

## METHOD AND APPARATUS FOR MARKING AND FORMING WORKPIECES

Charles W. Amos, Bowling Green, Ohio, assignor to Owens-Illinois Closure Inc., Toledo, Ohio

Filed Feb. 24, 1986, Ser. No. 831,956
Int. Cl.[4] B44B 5/00
U.S. Cl. 101—4 16 Claims



1. Apparatus for forming and placing indicia on a work piece, comprising;

(a) cooperating work piece forming members for forming a work piece by contact therewith, each member having work piece contact surfaces positioned to receive a work piece therebetween, one of said work piece contacting surfaces having an aperture formed therein for receiving incising means,

(b) incising means including a plurality of elements retained in an array in said aperture in said contact surface, each of said elements having an incising end and a support end, and

(c) means removably secured to said forming member receiving said incising means for selectively supporting each of said incising elements in one of two positions, a first position locating an incising end above said contact surface and a second position locating an incising end at or below said contact surface, thereby enabling a selected indicia to be incising on a work piece at the same time as the work piece is being formed by said contact surfaces.

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4,712,474

## AUTOMATIC ARTICLE HANDLING AND SCREEN PRINTING APPARATUS

Phil Motev, Lincolnwood, Ill., assignor to American Screen Printing Equipment Company, Chicago, Ill.

Filed Nov. 4, 1985, Ser. No. 794,508
Int. Cl.[4] B41F 17/22
U.S. Cl. 101—38 A 20 Claims

1. In a screen printing apparatus for automatically handling and printing on objects, the combination comprising:

a frame,

a screen printing station on said frame having a squeegee and screen assembly for screen printing on objects,

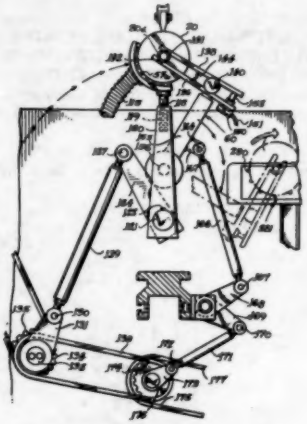
means for supplying a plurality of objects to a supply station for printing,

a first oscillatory transfer means for picking up a container at said supply station and for swinging the object through an arcuate path to a preregistering station,

preregistering means at a preregistering station for rotating the object to a predetermined orientation,

a second oscillatory transfer means for transfering a second object from the preregistering station by swinging the second object along an arcuate path to a transfer position,

a third oscillatory means for receiving the second object at the transfer position and for swinging the second object through an arcuate path to the printing station, and



discharge means for removing a third and printed object from the printing station and for depositing the printed object at a discharge station.

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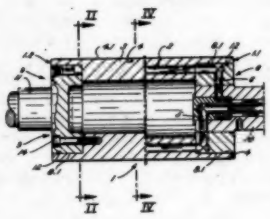
4,712,475

## INKING ROLLER FOR PRINTING MACHINES

Klemens Kemmerer, Seligenstadt, and Peter Hummel, Offenbach am Main, both of Fed. Rep. of Germany, assignors to M.A.N.-Roland Druckmaschinen Aktiengesellschaft, Fed. Rep. of Germany

Filed Jun. 13, 1986, Ser. No. 873,815
Claims priority, application Fed. Rep. of Germany, Jun. 14, 1985, 3521424
Int. Cl.[4] B41F 31/26
U.S. Cl. 101—348 5 Claims



1. An inking roller for an offset printing machine, which is adapted at one end to supply and discharge a temperature-control medium which flows in a counter-current flow and return fashion through free cross sections in the interior of the roller, characterized in that the inking roller is shaped in the form of a barrel and formed of aluminun having radially flanged journals mounted at both ends, the cross-section of the barrel including a plurality of substantially equal sized kidney-shaped ducts disposed near a wall of said barrel, said ducts being connected to the temperature-control medium supply and discharge by alternating star-shaped bores extending radially outwardly from adjacent the center-line inside one of said radially flanged journals mounted at one end of said barrel, said ducts being interconnected in pairs via substantially chord-like

recesses formed in said radially flanged journal mounted on the opposite end of said barrel to the end where the temperature-control medium is supplied and discharged, and the connection being such that the flow and return are disposed alternately side by side.

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**4,712,476**

## DEVICE FOR SECURING FLEXIBLE PRINTING PLATES UNDER TENSION ON A PLATE CYLINDER OF A ROTARY PRINTING MACHINE

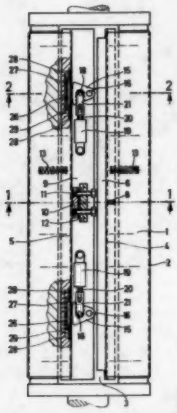
**Willi Jeschke, Heidelberg, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany**

**Filed Feb. 27, 1987, Ser. No. 19,875**

**Claims priority, application Fed. Rep. of Germany, Feb. 27, 1986, 3606351**

**Int. Cl.[4] B41F** *27/12*

**U.S. Cl. 101—415.1** **9 Claims**



**1**. In combination with a plate cylinder having a transverse channel, with sidewalls, formed therein, a device for securing a flexible printing plate under tension on the plate cylinder, a tensioning rail operatively associated with each end of the plate and being braceable against the side walls of the transverse channel formed in the plate cylinder for tensioning the printing plate, comprising means for selectively stretching and/or compressing at least one of the ends of a printing plate in the axial direction of the plate cylinder, the tensioning rail operatively associated with the one plate end being of one-piece construction and having a clamping member disposed at a middle region thereof and respective tensioning segments disposed at end regions thereof and means to selectively actuate the tensioning segments, for stretching and/or compressing the one plate end.

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**4,712,477**

## ELECTRONIC DELAY DETONATOR

**Kenichi Aikou; Yoichi Kurihara, and Tsugio Goto, all of Nobeoka, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Jun. 6, 1986, Ser. No. 871,487**

**Claims priority, application Japan, Jun. 10, 1985, 60-124181**

**Int. Cl.[4] F42C** *11/00*

**U.S. Cl. 102—206** **12 Claims**

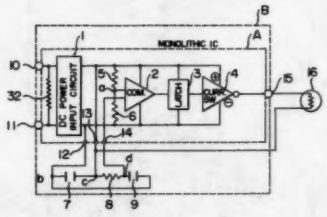
**1**. An electronic delay detonator, in a hybrid IC configuration, for igniting an ignition device through an ignition resistor a predetermined delay time after supply of electrical energy, comprising:

input terminal means for supplying the electrical energy to said electronic delay detonator;

a first capacitor for storing the electrical energy;

release prevention means, connected between said input terminal means and said first capacitor, for preventing the electrical energy supplied through said input terminal means and stored in said first capacitor from being released;

time constant circuit means, connected in parallel with said first capacitor and including a second capacitor and a first resistor, for charging the electrical energy supplied from said input terminal means at a rate whose time constant, which corresponds to said predetermined delay time, is determined by the product of a capacitance of said second capacitor and a resistance of said first resistor;




reference voltage generation circuit means, including a voltage divider connected across said first capacitor, for generating a compare reference voltage;

voltage comparator means for comparing the charged energy of said time constant circuit means with the compare reference voltage of said reference voltage generating circuit means to produce an output signal when the charged energy exceeds the compare reference voltage; and

transistor current switching circuit means, responsive to the output signal of said voltage comparator means, for establishing an electrical path to supply the electrical energy stored in said first capacitor to said ignition resistor of said ignition device.

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**4,712,478**

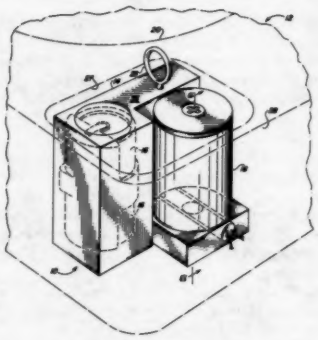
## ALIGN AT FIRE, SAFE AND ARM, AND POWER SUPPLY MODULE FOR A LAND MINE

**Steve A. Haglund, Minnetonka; Arthur M. Lohmann, Hopkins, and Sharon A. Pickering-Johnson, St. Louis Park, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Jan. 20, 1987, Ser. No. 4,937**

**Int. Cl.[4] F42B** *23/24*

**U.S. Cl. 102—424** **19 Claims**



**1**. A recoverable and refurbishable land mine **12** comprising:

a mine housing **20**;

a warhead **65** located in said mine housing;

electronic fuzing means **87** located in the mine housing **20** for producing under one set of predetermined conditions an align signal and shortly thereafter a fire signal and under another set of predetermined conditions a fire signal;

an align at fire, safe and arm, and power supply module **10**, said module including detonator means **44**, said detonator means **44** being initiated responsive to a fire signal produced by the fuzing means **87** being applied thereto; means forming a firing train **57**, said means forming a firing train **57** having an interrupted state and an aligned state, said means forming a firing train **57** initially being in its interrupted state; actuator means **32** responsive to an align signal produced by the fuzing means **87** for causing the means forming a firing train **57** to change from its interrupted state to its aligned state; said means forming a firing train **57** in its aligned state establishing a continuous lead from the detonator means **44** to the mine warhead **65** when the module **10** is mounted into the mine **12** for eventing the warhead **65** in response to the fuzing means **87** producing a fire signal; the application of a fire signal to detonator means **44** while the means forming a firing train **57** is in its interrupted state neutralizing the warhead **44**; and battery means **16** for producing electrical power;

means for removably mounting **22, 24** the module **10** into the mine **12**; and

means for providing electrical connections **100** between the battery means **16** and the fuzing means **87** and between the fuzing means **87** and the detonator means **44** and actuator means **32**.

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**4,712,479**

## MINE WITH ALARM AND TRIGGERING SENSORS

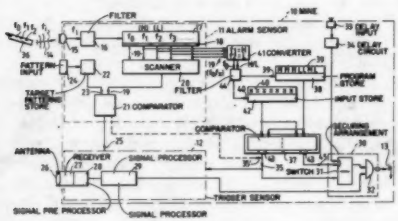
**Wolfgang Babel, Rothenbach, Fed. Rep. of Germany, assignor to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany**

**Filed Oct. 21, 1986, Ser. No. 921,951**

**Claims priority, application Fed. Rep. of Germany, Oct. 31, 1986, 3538785**

**Int. Cl.**[4] **F42C** *11/00, 15/14*

**U.S. Cl. 102—427** **8 Claims**




**1**. A mine comprising a vibration-responsive waking or alarm sensor; a triggering sensor for emitting a detonating signal responsive to said alarm sensor; a reversible electrically-actuatable securing arrangement for the emission of said detonating signal, said securing arrangement being resettable by said alarm sensor from an armed position into a secured condition.

**4,712,480**

## RE-SECURABLE MINE

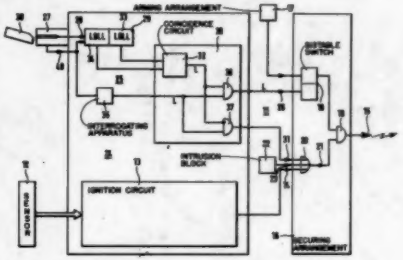
**Klaus Lindstadt, Schwaig; Andreas Halssig, Denkingen; Dietmar Maier, Rodenbach, and Stefan Scholz, Alzenau, all of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany**

**Filed Oct. 20, 1986, Ser. No. 922,070**

**Claims priority, application Fed. Rep. of Germany, Oct. 31, 1985, 3538786**

**Int. Cl.**[4] **F42C** *11/00, 15/14*

**U.S. Cl. 102—427** **12 Claims**




**1**. Re-securable mine including a triggering circuit, comprising a trigger securing arrangement for actuating said trigger circuit; a mine re-securing block including a comparator for a predeterminable information and for introduceable information for resetting the securing arrangement into a secured position at a predetermined relationship between said two informations.

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**4,712,481**

## ADDITIVE SEALING SLEEVE FOR A PROPELLENT CHARGE FOR LARGE-CALIBERED AMMUNITION FIRED FROM BARRELED WEAPONS

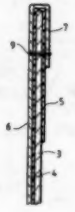
**Hansjorg Heinrich, Leinburg, and Josef Kraft, Schnaittach, both of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany**

**Filed Dec. 17, 1986, Ser. No. 942,874**

**Claims priority, application Fed. Rep. of Germany, Dec. 19, 1985, 3544927**

**Int. Cl.**[4] **F42B** *5/02*

**U.S. Cl. 102—435** **3 Claims**




**1**. Additive sealing sleeve for a propellent charge for large-calibered ammunition which is fired from barrelled weapons, said sealing sleeve being adhesively fastened within a cartridge casing, said sealing sleeve being constituted of a fabric material forming a support for a mixture of wax and titanium dioxide, wherein said mixture is covered by a polyethylene sheeting; the improvement comprising in that a textile material covers the surface of said polyethylene sheeting facing towards the propellent charge; and at least one seam connecting said textile material with said additive sealing sleeve.

4,712,482

## PROJECTILE WITH ACTIVE COMPONENTS

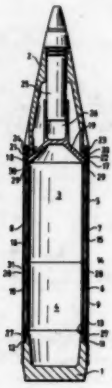
Erich Bock, and Gerald Rieger, both of Nuremberg, Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany

Filed Nov. 4, 1986, Ser. No. 927,247

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1985, 3542051

Int. Cl.[4] F42B *11/00*

U.S. Cl. 102—501 6 Claims



1. A projectile with active components which possess a cylindrical sheathing wall structure and are retained axially stacked in abutting contact between a projectile base and a projectile head; an ejecting arrangement for the ejection of the active components in said projectile, the sheathing wall structure of each said active component including at least two aligned axially-parallel through-extending bores; tie bolts extending through the aligned bores of the sheathing wall structures of said active components, each of said tie bolts having one end fastened to the projectile base and an opposite end fastened to the projectile head; breaking locations being provided on said tie bolts proximate the projectile base, proximate the abutting contact locations between said active components and proximate the projectile head; and means for clampingly engaging said tie bolts in said bores of the sheathing wall structure whereby, upon rupturing of the tie bolts at the breaking locations responsive to ejection of the active components, the separated parts of the tie bolts remain within the respective bores.

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4,712,483

## APPARATUS FOR SUPPORTING A VEHICLE FOR SIDEWAYS MOVEMENT

Edward W. Woodhall, 909 Covington Rd., Los Altos, Calif. 94022

Filed Mar. 4, 1985, Ser. No. 707,624

Int. Cl.[4] B61J *1/12*

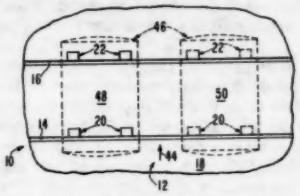
U.S. Cl. 104—48 26 Claims

1. Apparatus for supporting and moving a vehicle comprising:

a floor part having an upper surface and a pair of spaced grooves extending into the upper surface thereof;

a pair of roller members for each groove, respectively, each pair of roller members being adjacent to the respective groove and movable in rolling relationship over the upper surface of the floor part, the pair of roller members corresponding to one groove being movable independently of the pair of roller members corresponding to the other groove; and

means on each pair of roller members, respectively, and extending into the respective groove for coupling the pair of roller members to the respective groove for movement



longitudinally of the groove, each pair of roller members having an upper, wheel-supporting surface.

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4,712,484

## CONVEYOR ARRANGEMENT

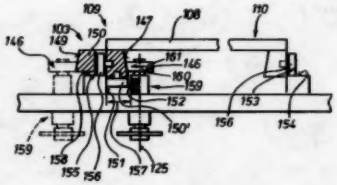
Walter Sticht, Attnang-Puchheim, Austria, assignor to STIWA-Fertigungstechnik Sticht GesmbH, Attnang-Puchheim, Austria

Division of Ser. No. 591,560, Mar. 20, 1984, Pat. No. 4,619,205. This application Jun. 25, 1986, Ser. No. 878,342

Claims priority, application Austria, Mar. 29, 1983, 1117/83; Feb. 6, 1984, 360/84

Int. Cl.[4] B61B *13/00*

U.S. Cl. 104—165 9 Claims



1. A conveyor arrangement for conveying a workpiece carrier in a conveying direction, the carrier having two opposite sides, a respective one of the carrier sides being constituted by a support ledge extending in the conveying direction and having a first side face and a second side face spaced from the first side face in a direction transverse to the conveying direction, and a guide means associated with the support ledge for vertically and laterally guiding the carrier in said direction, the guide means comprising

(a) a means for advancing the carrier in the conveying direction, the advancing means including

(1) a succession of entrainment elements engaging the first support ledge side face and spaced in the conveying direction,

(b) a guide ledge having an upper guide face for vertically guiding the carrier and a side guide face for laterally guiding the carrier, the upper and side guide faces extending along the second side face of the support ledge, and

(c) a succession of guide elements mounted on the support ledge and spaced in the conveying direction, a first group of said guide elements engaging the side guide face of the guide ledge without play for laterally guiding the carrier and a second group of said guide elements engaging the upper guide face and mounted on the second side face of the support ledge for vertically guiding the carrier, the entrainment elements exerting a pressure having a vertical force component directed against the upper guide face on the guide elements of the second group, the guide elements of the second group being staggered in the conveying direction from the guide elements of the first group.

4,712,485

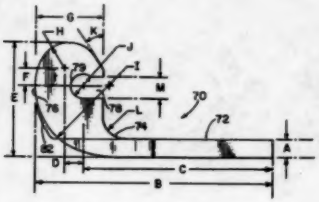
## RESTRICTING BRACKET FOR AUTOMATIC TRANSPORT SYSTEM

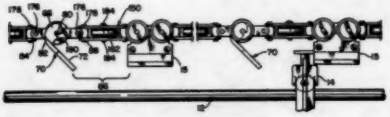
Roald P. Nymark, Simsbury, Conn., assignor to Gerber Garment Technology, Inc., South Windsor, Conn.

Continuation of Ser. No. 738,089, May 24, 1985, abandoned. This application Dec. 22, 1986, Ser. No. 946,174

Int. Cl.[4] B61B 3/00

U.S. Cl. 104—172.4 2 Claims



1. In an automated transport system, the combination comprising:

a rail, a plurality of free traveling workpiece carries which ride on said rail, a chain for propelling said workpiece carriers along said rail, said chain including a plurality of pushers for engaging said workpiece carriers and a horizontal pin extending transversely of said chain spaced ahead of each of said pushers, a restricting bracket pivotally suspended from each of said pins for permitting the associated one of said pushers to move into engagement with a workpiece carrier initially located downstream of said restricting bracket and for thereafter preventing said workpiece carrier from moving forwardly of said associated pusher beyond said restricting bracket, said restricting bracket having a curved head portion and an elongated stem portion extending downwardly from said head portion into the path of said workpiece carrier, said head portion including an inwardly extending recess for receiving said pin and terminating in a throat having a generally downwardly facing bearing surface pivotally engaged with said pin, said head portion being manually moveable along said recess in upward relation to said pin to remove said restricting bracket from said pin and chain, and means for limiting the pivotal movement of said restricting bracket relative to said chain in the direction corresponding to forward pivotal movement of said stem portion, said means for limiting the pivotal movement of said restricting bracket relative to said chain being a spacer on said chain forward of said pin for engaging said stem at a point located along the length of said stem between said pin and the point at which said carrier engages said stem so that the force exerted by said carrier on said stem tends to pivot said stem about said spacer to urge said bearing surface of said throat into engagement with said pin and to thereby oppose movement of said bracket from said pin.

4,712,486

## AERIAL ROPEWAY TRANSPORT INSTALLATION WITH THE ROPE STOPPING TO DETACH THE CARS IN THE TERMINAL

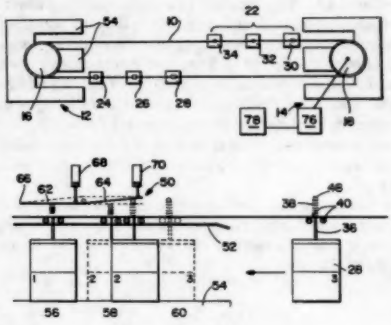
Serge Tarassoff, Seysinet, France, assignor to Pomagalski S.A., Fontaine, France

Filed Jun. 4, 1986, Ser. No. 870,414

Claims priority, application France, Jun. 14, 1985, 85 09588

Int. Cl.[4] B61B 1/00, 11/00

U.S. Cl. 104—173.1 6 Claims




1. An aerial ropeway transport installation having a rope extending between two terminals comprising a motor for driving said rope and a device for controlling the speed of said motor, at least a first and second vehicle each having a detachable grip for coupling the vehicles to the rope at a first set distance apart and uncoupling them in the terminals for loading and unloading with the vehicles at a standstill, a detachment area of said grips extending along the rope in the terminal, a platform constituted by said detachment area, at least first and second control means for controlling said grips located at a second set distance apart in said detachment area, said second distance being less than said first distance, said first grip control means being arranged to detach the first vehicle from the rope and the second grip control means being arranged to detach the second vehicle from the rope so that a distance between the two detached vehicles in the terminal is the same as said second set distance, said speed control device being arranged so as to almost stop the rope each time said grip control means detach a vehicle from the rope and to reaccelerate the rope after detachment has taken place.

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4,712,487

## SIDE BEARING UNIT FOR RAILROAD CAR, INCLUDING METHOD OF MAKING

Robert L. Carlson, Skokie, Ill., assignor to Miner Enterprises, Inc., Geneva, Ill.

Continuation of Ser. No. 738,506, May 28, 1985, abandoned, which is a continuation of Ser. No. 494,239, May 13, 1984, abandoned. This application Jul. 17, 1986, Ser. No. 886,931

Int. Cl.[4] B61F 5/14; F16C 27/02

U.S. Cl. 105—199.3 10 Claims

4. A method of making a railroad side bearing unit, comprising the steps of:

providing a generally rectangular cap with a top surface for engaging a wear plate of a railroad car;

forming a keyway in the underside of said cap;

providing a block of thermoplastic elastomer material having a selected transverse configuration including sides and ends and a selected initial free height, and forming the block with an integral key at the top thereof for fitting in the keyway of said cap;

assembling the block with the cap by locating the key of the block in the keyway of the cap to thereby form an assembly;

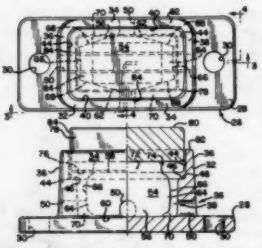
applying to said assembly a force sufficient to compress the block at least 30% of its initial free height to permanently reduce the height and permanently change the transverse shape of the block such that said ends each are formed with an end wall vertically convex and horizontally concave and tapering to proximately align with and join said sides and to permanently expand and lock said key of the block into the keyway of the cap;

removing said force from the assembly; and

providing a housing adapted for attachment to a bolster of a truck of said car, the housing being provided with a generally rectangular cavity complementary to the generally rectangular shape of said cap and fitting closely with the cap to present substantial movement of the cap relative to the housing in a twisting direction and a direction transverse to the direction of applying said force, the sides of said permanently compressed block being separated from the housing to form a continuous clearance space therebetween.

7. A side bearing unit for use with a railroad car, comprising:

a generally rectangular cap with a top surface for engaging a wear plate of a railroad car, with a keyway in the underside of the cap;



a body of thermoplastic elastomeric material having a selected transverse configuration including sides and ends and axial free height with an integral key at the top thereof for fitting in the keyway of said cap, defined by axially compressing said body by an extent equal to at least 30% of the initial free height to permanently reduce the height and permanently change the transverse shape of the body such that said ends each are formed with an end wall verticaly convex and horizontally concave and tapering to proximately align with and join said sides and to permanently expand and lock said key of the block into the keyway of the cap;

a housing adapted for attachment to a bolster of a truck of said car, including a generally rectangular housing cavity defined by surrounding side wall means, the sides of said permanently compressed body being separated from said side wall means to form a continuous clearance space therebetween, and the side wall means of said generally rectangular cavity fitting closely to the generally rectangular cap to prevent relative substantial movement of the cap relative to the housing in a twisting direction and a direction transverse to the direction of compressing said body, and to thereby limit movement of the cap and attached body in a direction substantially parallel to the direction of compressing said body.

**4,712,488**

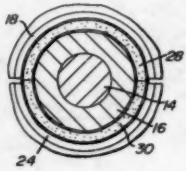
## ELASTOMERIC MEMBER HAVING FLEXIBLE WOVEN MATERIAL BONDED THERETO IN A RAILWAY TRUCK PRIMARY SUSPENSION SYSTEM

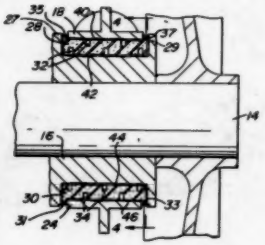
**James M. Herring, Jr., Merion Station, Pa., assignor to The Budd Company, Troy, Mich.**

**Substitution of Ser. No. 612,822, May 22, 1984, abandoned. This application Oct. 24, 1986, Ser. No. 905,602**

**Int. Cl.[4] B61F 5/26**

**U.S. Cl. 105—224.1** **1 Claim**




1. In a railway truck including a side frame with a clamp to receive a journal bearing assembly for an axle,

a primary suspension system disposed between said journal bearing assembly and said side frame and clamp comprising:

(a) a pair of elastomeric half-ring members disposed between said journal box assembly and said side frame and clamp;

(b) the opposite surfaces of each of said elastomeric members including high wear flexible woven material bonded thereto;

(c) each of said elastomeric half-ring members including lip portions extending outwardly to receive portions of said side frame and said clamp therebetween with said lip portions including woven material bonded thereto;

(d) said elastomeric members further including voids therein:

(e) said woven material preventing bulging in the areas of said voids of the elastomeric material when subjected to heavy car loads, and

(f) said elastomeric members conforming to irregular surfaces in said journal box assembly said side frame and said clamp.

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**4,712,489**

## PROCESS FOR MARKING AND/OR DESTROYING VALUABLE DOCUMENTS IN PARTICULAR AND DEVICE FOR MAKING USE OF IT

**Jean R. Levavasseur, Triel, France, assignor to Axytel, Dijon, France**

**Filed Dec. 13, 1985, Ser. No. 808,574**

**Claims priority, application France, Dec. 14, 1984, 84 19174**

**Int. Cl.[4] E05G 3/00, 1/12**

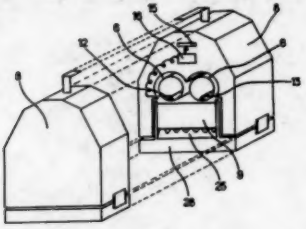
**U.S. Cl. 109—25** **6 Claims**

1. Apparatus for marking and/or destroying valuable documents contained in an enclosure, comprising:

(a) a vessel containing a deleterious substance means for

damaging the documents to render them unusable or legally identifiable;

(b) a pyrotechnic charge means located and detonated at a position which lies between the documents and the vessel so that energy from the pyrotechnic charge is released in one direction toward the vessel and in an opposite direction toward the documents, to cut the documents and



increase their receptivity to said deleterious substance means;

(c) said vessel having an outlet opening means for releasing the substance into the documents to render the documents unusuable or legally identifiable, said outlet opening means being openable by cutting in response to energy from the detonation of said pyrotechnic charge.

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**4,712,490**

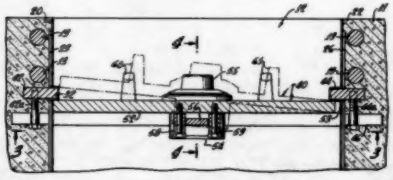
**SAFE**

**Robert J. Lichter, 15571 Placid Cir., Huntington Beach, Calif. 92647**

**Filed Feb. 27, 1986, Ser. No. 833,889**

**Int. Cl.[4] E05G *1/00***

**U.S. Cl. 109—69** **24 Claims**



1. In a safe apparatus, the combination comprising:

wall means defining a generally rectangular chamber for receiving valuables therein through an access opening thereof;

ledge means on said wall means extending partially into said chamber;

lockbolt receiving means on one of said wall means generally centrally relative thereto;

first and second groove means on oppositely disposed ones of said wall means in transverse relation to said one wall means with said lockbolt receiving means, said first groove means having a depth at least twice the depth of said second groove means;

separate door means for closing said opening, said door means including at least a first and second opposing edge portions having a thickness sufficient for being received within said groove and having a first dimension in the direction between said groove means generally equal to the distance between the innermost ends of said groove means plus a distance generally equal to the depth of said first groove means, and a second dimension orthogonal to said first dimension generally equal to the spacing between the wall means in that direction, said door means being inserted by positioning at an angle with said first edge thereof on said ledge means and then sliding said edge into said first groove means while pivoting said second edge thereof toward said ledge means; and

lock means on said door mean including a lockbolt actuable from a first unlocked position into a second locked position in engagement with said lockbolt receiving means only with said door means in abutting relation with the bottom of said second groove means.

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**4,712,491**

**PROCESS AND APPARATUS FOR THE CONTROLLED BURNING OF A VERTICAL STACK OF SOLID FUEL**

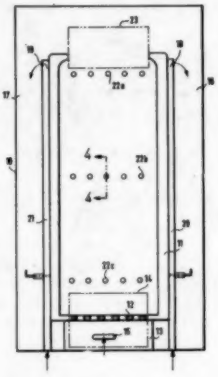
**Lothar Schmidt, Munich, Fed. Rep. of Germany, assignor to Wamsler-Herd-Und Ofen GmbH, Munich, Fed. Rep. of Germany**

**Filed Mar. 5, 1986, Ser. No. 836,494**

**Claims priority, application European Pat. Off., Mar. 5, 1985, 85102479.4**

**Int. Cl.[4] F23G *5/24***

**U.S. Cl. 110—346** **17 Claims**



1. A process for the controlled combustion of a vertical stack of solid fuel which comprises the steps of

igniting the top of said vertical stack of solid fuel such that combustion will commence at the top of said vertical stack and move downwardly towards its bottom as a moving zone of combustion,

supplying a minor portion of the air necessary for combustion of said solid fuel in said vertical stack to the bottom of said vertical stack,

supplying a major portion of the combustion air necessary for combustion of said solid fuel in said vertical stack to the side of said vertical stack, all of said major portion of the combustion air being gradually supplied to said vertical stack at sequentially lower, generally horizontal levels thereof as said zone of combustion moves downwardly along said vertical stack, and

removing waste combustion gases from the top of said vertical stack.

3. A furnace for burning solid fuel in a controlled manner, said furnace comprising

a housing having a fill door,

a vertical furnace shaft mounted in said housing for receiving solid fuel supplied to said housing through said fill door, said vertical shaft having an open upper end and a bottom end and combustion air supply openings in its side at different vertical levels along its length for supplying a major portion of the required combustion air to the solid fuel therein,

a grate located at the bottom of said vertical shaft through which a minor portion of the combustion air needed to burn the solid fuel therein can enter said vertical shaft,

means forming downwardly-extending waste gas channels

within said housing and outside of said vertical shaft, said waste channels conveying waste combustion gases passing through the open upper end of said vertical furnace shaft downwardly and out of said housing,

means forming secondary air vents communicating with said downwardly-extending waste gas channels near their upper ends in communication with the open upper end of said vertical shaft so as to secondarily burn combustion gases coming from said vertical shaft, and

means for supplying adjustable amounts of combustion air to said respective combustion air inlet openings in the side of said vertical furnace shaft.

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**4,712,492**

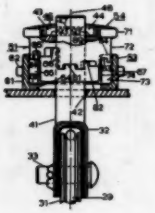
**IMPLEMENT POSITION ADJUSTING DEVICE**

**David L. Murray, Lee's Summit, Mo., assignor to Deutz-Allis Corporation, Milwaukee, Wis.**

**Filed Sep. 29, 1986, Ser. No. 912,961**

**Int. Cl.[4] A01C *5/06***

**U.S. Cl. 111—88** **8 Claims**



1. An adjustable spacer for adjusting the axial position of a rod relative to a support transverse thereto, comprising:

an opening in said support through which said rod extends, diametrically opposite radially extending projections spaced from said support,

a collar surrounding said rod and engaging said support, said collar having a pair of diametrically opposite abutments facing in the axial direction toward said projections and

an annular knob having

a central opening generally concentric with the axis of said knob through which said rod extends,

at least two series of circumferentially spaced steps on the exterior of said knob, each series of steps including a plurality of axially spaced horizontal abutment surfaces facing toward said support, corresponding abutment surfaces of said series of steps being selectively engageable with said abutments, and

a plurality of pairs of diametrically opposite shoulders extending radially outward in relation to the axis of said central opening, each pair of shoulders presenting radially extending abutment faces at the same axial position relative to said central opening and in selectively engageable relation to said projections.

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**4,712,493**

**BUTTON SEWING MACHINE**

**Hideo Aso, Chofu; Hirohisa Fujino, Yamatotakada, and Seiichi Saibe, Kashihara, all of Japan, assignors to Tokyo Juki Industrial Co., Ltd., Tokyo, Japan**

**Filed May 29, 1987, Ser. No. 55,784**

**Claims priority, application Japan, May 30, 1986, 61-126673**

**Int. Cl.[4] D05B *3/14***

**U.S. Cl. 112—112** **2 Claims**

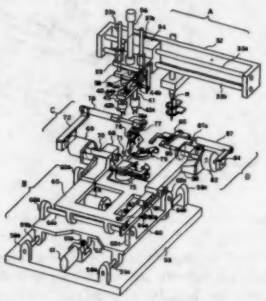
1. In a button sewing machine having a needle which is provided with the predetermined length of thread for button sewing and travels between an upper needle bar spindle and a lower needle bar spindle being received by each spindle alternately per each needle stroke such that a button is sewn in a manner simulating hand sewing, a button sewing machine comprising:

a movable table which moves in X and Y directions by operation of two motors,

a stay button chucking device placed on said movable table,

a surface button chucking device placed on said movable table,

a button holding device which transfers both a stay button



and a surface button to said stay button chucking device and to said surface button chucking device, respectively, said button sewing machine adapted to clamp said stay button and said surface button by said stay button chucking device and said surface button chucking device, respectively, and being adapted to place a workpiece and keep button holes in axial alignment, and to sew the stay button and the suface button simultaneously while moving said movable table in X and Y direction.

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**4,712,494**

**AUTOMATIC EXCHANGE OF THE SIZE IN AN AUTOMATIC SEWING UNIT**

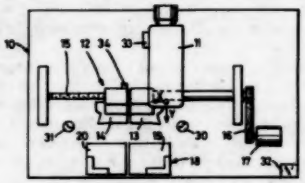
**Flavio Bisson, Cava Manara Pv, Italy, assignor to Necchi Societa per Azioni, Pavia, Italy**

**Continuation of Ser. No. 913,315, Sep. 30, 1986, abandoned. This application Mar. 27, 1987, Ser. No. 31,195**

**Claims priority, application Italy, Sep. 30, 1985, 42912-A/85**

**Int. Cl.[4] D05B *21/00, 3/04***

**U.S. Cl. 112—121.12** **4 Claims**



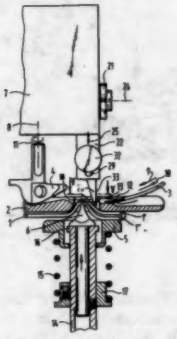
1. An automatic exchange of the size in an automatic sewing unit comprising a sewing machine displaceable along two axes and a workpiece clamp group formed by at least two half-clamps of which one is fixed and the other mobile in order to obtain different sizes, comprising a machine positioned on a basic size $\phi$, corresponding to the $\phi$ position of said axes, automatically movable in a positive way along one of said axes, for reading the displacement effected by said mobile half-clamp, and means for pointing out and memorizing the absolute coordinate of said axes.

4,712,495

## CHAIN-STITCHING AND BLIND-STITCHING MACHINE FOR POINT-SEWING ARTICLES

Johannes Jagielski, Gladbeck, Fed. Rep. of Germany, assignor to J. Strobel & Sohne GmbH & Co., Fed. Rep. of Germany

Filed Apr. 24, 1986, Ser. No. 855,388
Claims priority, application Fed. Rep. of Germany, Apr. 26, 1985, 3515189
Int. Cl.[4] D05B 1/24, 57/04
U.S. Cl. 112—176 6 Claims



1. A chain-stitch blind stitch sewing machine having a machine head for sewing material at separate points with a predetermined number of stitches at each point and comprising:

(a) a contacting plate having an aperture;

(b) a presser disposed on a first side of said contacting plate for pressing the material being sewn against the contacting plate;

(c) a bulge former disposed on said first side of said contacting plate for bulging the material being sewn into said contacting plate aperture;

(d) an arcuate needle disposed on a second side of said contacting plate so as to oscillate about a first axis extending generally parallel to the contacting plate and to be laterally displaceable for alternately piercing the bulged material being sewn at two sites mutually spaced along a line extending generally parallel to said first axis;

(e) a rotating looper disposed on said second side of said contacting plate for cooperation with said swinging arcuate needle to form chain-stitches;

(f) a slide disposed on said second side of said contacting plate and adjustably attached to the machine head;

(g) a stitch loosening finger disposed on the second side of the contacting plate and projecting toward the material being sewn between said two sites on the side thereof from which said arcuate needle pierces the material being sewn for picking up sewing thread portions extending between the two sites;

(h) means to rotatably attach said stitch loosening finger to said slide such that it may pivot about a second axis extending generally parallel to the first axis;

(i) clamping means interposed between said slide and said stitch loosening finger to clamp the stitch loosening finger in a desired position on the slide to provide a corresponding length of sewing thread portions; and,

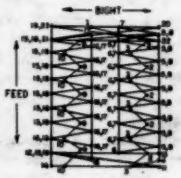
(j) actuation means to displace said slide between two positions on the machine head so as to set said stitch loosening finger into a first, thread pick-up position and a second, non-operative position.

4,712,496

## MACHINE STITCHED BUTTONHOLE AND METHOD OF PRODUCING SAME

John Brown, Wilton, Conn.; Stephen A. Garron, Elizabeth, and John W. Wurst, Chester Township, Morris County, both of N.J., assignors to SSMC Inc., Stamford, Conn.

Filed Nov. 28, 1986, Ser. No. 936,006
Int. Cl.[4] D05B 3/06
U.S. Cl. 112—264.1 2 Claims




1. A method of producing a buttonhole on a sewing machine having a needle, mechanism for jogging said needle laterally, a four motion work feed mechanism, and pattern means for controlling said needle jogging and work feeding mechanisms, comprising the steps of:

sequentially stitching a leg along each side of said buttonhole and a bar spanning both said legs at each end of said buttonhole, utilizing said pattern means at least during stitching of each leg of said buttonhole to implement a stitch pattern in which stitches extend alternately parallel to the length of said buttonhole and substantially transversely of the length of said buttonhole, said stitches extending parallel to the length of said buttonhole being formed at twice the stitch length and in the opposite direction of work feed from said transversely extending stitches.

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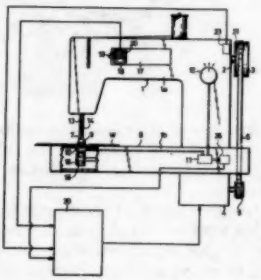
4,712,497

## SEWING MACHINE

Etuzo Nomura; Yasuo Sakakibara; Tetsuo Kozawa; Yukio Nishida, and Ikuzo Kondo, all of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Apr. 18, 1986, Ser. No. 853,486
Claims priority, application Japan, Apr. 25, 1985, 60-89280
Int. Cl.[4] D05B 27/22, 69/22
U.S. Cl. 112—315 4 Claims



1. In a sewing machine comprising:

a stitch forming device for forming a straight seam of a series of stitches on a work fabric, said stitch forming device including a sewing needle reciprocally movable in synchronism with the rotation of a main shaft of the sewing machine;

a work feeding device including a presser foot and a feed dog for intermittently feeding the work fabric in synchronism with the rotation of the main shaft;

a feed adjusting device for adjusting the feed pitch by said feed dog; and

a manual adjusting knob operatively coupled to said feed adjusting device for changing said feed pitch;

the improvement comprising:

means for generating feed pitch data corresponding to the adjusted amount of said feed adjusting device;

a keyboard arrangement having selection keys enabling the selection of a numerical value corresponding to a seam length for setting a preset seam length;

means for detecting a predetermined needle position on a reciprocal path of said sewing needle;

means for sequentially computing the total seam length based upon said feed pitch data generated by said feed pitch data generating means in response to the detection of said detection means;

means for distinguishing the coincidence between said computed total seam length and said present seam length; and

means for stopping the operation of the sewing machine upon said coincidence distinguished by said distinguishing means.

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**4,712,498**

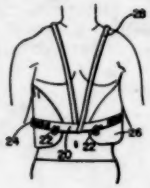
## MULTIPLE SUPPORT BAR FOR MANIPULATION OF A HAND-HELD SAIL ASSEMBLY

**Richard B. Oser, Houston, Tex., assignor to New Ocean Wind Products, Inc., Houston, Tex.**

**Continuation-in-part of Ser. No. 864,824, May 19, 1986. This application Oct. 20, 1986, Ser. No. 920,462**

**Int. Cl.[4] B63H *9/04***

**U.S. Cl. 114—39.2** **17 Claims**




1. An apparatus for securing a sailor to a sailboarding assembly comprising a sailboard, mast, boom and sail, and having a harness line connected at each end to said boom, said apparatus comprising;

a rigid bar member adapted to be secured circumferentially around the front portion of a sailor's torso;

a plurality of open hook members spaced along said bar member, extending generally perpendicularly from and rigidly fixed to said bar member for connecting said bar member to the sailing assembly;

means for securing said bar member on the sailor's torso; and

said open hook members being adapted to be connected to said harness line at spaced points thereon to provide connections from multiple points on the sailor's torso to the sailing assembly whereby movements of the multiple hook members transmit movement from two points on the bar member to two points on the harness line for manipulation of said sailing assembly by body movements.

**4,712,499**

## METHOD OF MOUNTING BLISTER ON SHIP'S HULL IN DRY DOCK

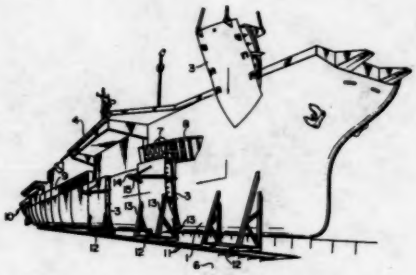
**Kenji Haruguchi; Takuma Kohguchi, and Osamu Sekiya, all of Yokohama, Japan, assignors to Sumitomo Heavy Industries, Ltd., Tokyo, Japan**

**Filed Jul. 18, 1986, Ser. No. 886,706**

**Claims priority, application Japan, Jul. 19, 1985, 60-159471**

**Int. Cl.[4] B63B *9/06***

**U.S. Cl. 114—77 R** **3 Claims**



1. A method for attaching a blister along the side of the shell of a ship or similar structure in a dry dock having a bottom wall and side walls, said blister to be attached at said side of said ship shell adjacent the side wall of said dry dock, comprising: providing rails on the bottom of said dry dock along the sides of said shell of the ship on which said shell is to be attached such that each rail extends in the longitudinal direction of said dry dock along said dry dock bottom at a spaced distance from said dry dock side wall; movably mounting at least one truck on at least one of said rails; placing a blister block having a guide member for engaging said dry dock side wall on said truck; moving said truck carrying said blister block to a position where said blister block is to be attached to said shell; and, with said guide member engaging said dry dock side wall, raising said blister block off of said truck and fixing said blister block to said shell.

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**4,712,500**

## MAST FOR SAILBOAT

**Daniel Montandon, Yverdon-Les-Bains, Switzerland, assignor to Nirvana Espar Systems S.A., Yverdon-Les-Bains, Switzerland**

**Filed Feb. 21, 1986, Ser. No. 831,766**

**Claims priority, application France, Feb. 21, 1985, 85 02647**

**Int. Cl.[4] B63B *15/00***

**U.S. Cl. 114—90** **16 Claims**

1. A mast for sail boats having a cross-section which exhibits:

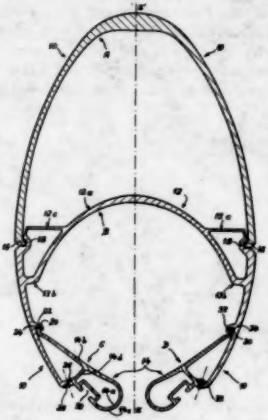
an external portion having roughly the form of a horseshoe with rearwardly extending arms defining a horseshoe opening;

an internal portion arranged within the external portion for reinforcement thereof and having the form of an arc of a circle with the same axis of symmetry and open on the same side as the external portion, the ends of said arc being respectively coupled to the arms of the horseshoe; and

two rigid closing members fixed to the respective arms for reinforcement thereof and forming two lips which partially close the horseshoe opening but leave therebetween sufficient space to allow passage of a sail retained within the mast;

each of said rigid closing members providing a closed hollow wall portion of substantially triangular cross-section comprising a wall facing toward the interior of the mast, a wall facing toward the exterior of the mast, and a rounded wall forming the base of said triangular cross-sec-

tion and providing a softened profile at an extremity of a corresponding one of said lips for reducing the risk of damage to a sail when it contacts said corresponding lip; and,



said mast comprising a first extrusion forming one of said closing members, a second extrusion forming the other of said closing members, and a third extrusion forming at least one of said external and internal portions.

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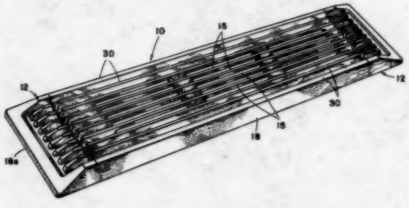
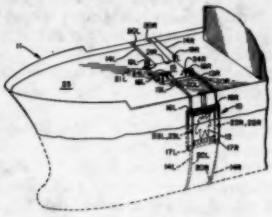
**4,712,501**
**BOAT VENT**
**Warwick M. Whitley, II, Panama City, Fla., assignor to Attwood Corporation, Lowell, Mich.**
**Filed Feb. 12, 1987, Ser. No. 14,224**
**Int. Cl.[4] B63J *2/00***
**U.S. Cl. 114—211** **14 Claims**



1. A grill for covering a vent opening in a panel of a boat, said grill having a primary section and a pair of end sections, said primary section having a ventilation zone, said zone having a plurality of air flow openings extending therethrough, said zone being spaced from both sides and the ends of said primary section; each of said end sections and ends of said primary section having a back face with a recess therein, said primary and end sections having abutting edges and interengaging fingers in their respective recesses and projecting from their respective edges with the fingers on said primary section extending into the recess and behind the back face of the corresponding one of said end sections whereby said end sections hold said primary section against the surface of said panel.

**4,712,502**
**SEAL PAC DIAPER**
**George L. McDuff, and Bobby G. McCoy, both of 308 E. Verdine St., Sulphur, La. 70663**
**Filed Sep. 8, 1986, Ser. No. 904,712**
**Int. Cl.[4] B63B *43/16***
**U.S. Cl. 114—229** **17 Claims**



1. A seal pack diaper for vessels including ships such as an oil tanker mountable about a ruptured opening in a wall of a vessel comprising: a lipped mouth seal structure with a plurality of inflated side by side lips that as a lip structure enclose a generally rectangular area and a flexible resiliently compressible material seal member mounted on the front face of said side by side lips for engaging the wall of a vessel around an area of rupture opening; a leak proof flexible membrane spanning the area enclosed by said side by side lips and overlying and bonded to the back side of said side by side lips; transverse cross brace bar means overlying the back of the top and bottom portions of said side by side lips and fastened to said leak proof flexible membrane; vertically oriented flexible strap means overlying the backs of the opposite side sections of said side by side lips; strap end to cable connector means connected to each end of said flexible strap means; and a cable system including cables connected to each of said strap end to cable connector means for positioning said seal pack diaper on a vessel wall over a ruptured opening in the vessel wall and to hold the diaper firmly in place over the ruptured opening in the wall; wherein said transverse cross brace bar means overlying the back of the top and bottom positions of said side by side lips includes at least one transverse cross brace bar at the top, and at least one transverse cross brace bar at the bottom of said seal structure; and said transverse cross brace bars are individually retained in rearwardly extended sleeves fastened to the seal structure; and wherein said vertically oriented flexible strap means overlying the backs of the opposite side sections of said side by side lips includes at least one vertically oriented flexible strap at each side of said seal pack diaper; and with said vertically oriented flexible straps each individually running through a vertically extended sleeve in the back of said seal structure.

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**4,712,503**
**BOAT TRANSOM PLATFORM STEP DEVICE**
**Robert G. Ritten, Ft. Pierce, Fla., assignor to Step On Inc., Ft. Pierce, Fla.**
**Filed Apr. 20, 1987, Ser. No. 40,889**
**Int. Cl.[4] E06C *5/26***
**U.S. Cl. 114—343** **5 Claims**

1. A step device for mounting on the transom platform of a boat that may be moved between a use position wherein a step thereof is immersed in the water in which the boat floats and a storage position wherein said step is located above said platform out of said water, which step in said use position permits a person to climb out of said water and onto said platform without said step making any appreciable movement relative to said platform during such climb, comprising:

a step means, a bracket means and a pair of pin members.

said step means including:

a first tubular support member having:

an L-shaped portion defined by a leg section with a top

end and a step section joined normally to said leg section via an arcuate section,

a lateral portion that extends integrally and normally from said top end of said L-shaped portion,

an abutment portion that extends integrally from said lateral portion in the direction of said step section spaced apart from and parallel to said leg section,

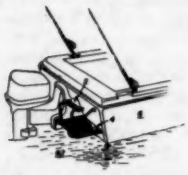
said L-shaped, said lateral and said abutment portions all lying in a the same longitudinal plane, and

a bore through said lateral portion normal to said plane between said L-shaped portion and the center-line of said abutment portion,

a second tubular support member substantially identical to and spaced apart from said first tubular support member,

a flat, rectangular step defined by two longitudinal sides and two ends, said step being fixed adjacent one of said ends to said step section of said first support member and adjacent the other of said ends to said step section of said second support member, and

said bracket means including:



a first mount member having:

a rectangular base section with a fore end, and aft end and fastener admission holes,

a pair of integral side sections that project laterally from said base section,

said side sections being spaced apart from each other a distance slightly greater than the width of the tubing of which said first and second support members are formed,

said side sections extending beyond said aft end of said base section, and

a hole in each of said side sections in the area thereof that is beyond said aft end, and

a second mount member substantially identical to said first mount member,

one of said pin members extending through said holes in said first mount member and said bore in said first support member connecting them together, and

the second of said pin members extending through said holes in said second mount member and said bore in said second support member connecting them together.

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**4,712,504**

## TENNIS SCORING MEANS

**Marilyn J. Zarley, and Donald H. Zarley, both of 3709 Southern Hills Dr., Des Moines, Iowa 50321**

**Filed Apr. 7, 1986, Ser. No. 848,760**

**Int. Cl.[4] A63B *49/00*; G09F *9/40***

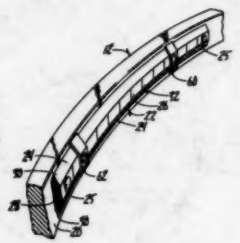
**U.S. Cl. 116—222** **10 Claims**

1. The combination of a tennis racquet having a frame comprising an elongated handle terminating in an open oval-shaped frame segment, and a tennis scoring device comprising,

an elongated body member having a longitudinal axis, and a top, a bottom and opposite side edges, said bottom being secured to said frame and said side edges being free from contact with said frame along their entire length,

visible tennis scoring indicia means secured to said body member and extending in a direction parallel to said axis, said indicia means divided into a plurality of indicia segments,

and at least one slide member movably slidably mounted on said body member and adapted for movement in a direction parallel to said axis, and being adapted to be positioned adjacent different of said indicia segments, whereby the scorer cans move the slide member to a position adjacent the indicia segment that properly reflects the tennis score being kept, said slide member comprising a resilient U-shaped member having a top that extends over the top of said body member, and depending tabs that slidably engage said side edges of said body member, said body member having a width greater than



the normal width of said slide member so that said tabs are resiliently forced apart by the side edges of said body member whereby said tabs are laterally extended to exert spring tension against said side edges of said body member to create sufficient friction therebetween to releasably hold said slide member in a fixed position on said body member when a tennis ball hits the racquet as the tennis game is being palyed, while also permitting the slide member to be easily and quickly slidably moved on said body member to change the tennis socre being kept.

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**4,712,505**

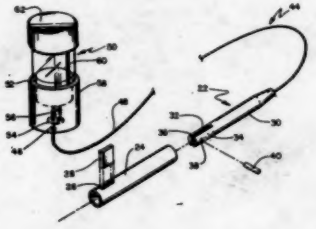
## COMBINATION HAZARDOUS LIQUID AND WATER SENSOR

**H. Kent Wainwright, Laramie, Wyo., assignor to In-Situ, Inc., Laramie, Wyo.**

**Filed Oct. 18, 1985, Ser. No. 789,153**

**Int. Cl.[4] G01F *23/00***

**U.S. Cl. 116—227** **3 Claims**



1. An apparatus for use in sensing the presence of a first substance and for sensing the presence of a different second substance within an annular space defined by an inner wall and outer wall of a double wall storage tank, the apparatus comprising:

first sensing means for sensing the presence of said first substance, wherein said first sensing means weakens upon contact with said first substance;

second sensing means for sensing the presence of said second substance, wherein said second sensing means weakens upon contact with said second substance;

holder means for holding said first and second sensing means, wherein during use at least a portion of said holder means moves from a first position to another position

when said first sensing means weakens upon contact with said first substance and/or when said second sensing means weakens upon contact with said second substance;

connecting means having first and second ends, said first end for connecting with said holder means, wherein said connecting means is elongated and flexible, and wherein said holder means and first and second sensing means are positioned during use in a bottom portion of said annular space free from restrictive engagement with said inner wall and outer wall of said double wall storage tank; and

indicator means for indicating the presence of said first substance and/or said second substance, said indicator means being connected to said second end of said connecting means to be mechanically responsive during use to movement of said holder means away from said first position thereof.

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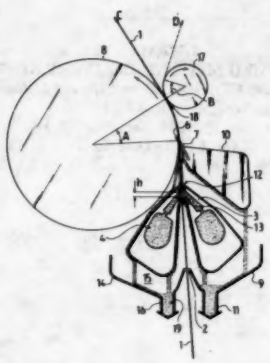
4,712,506

## DEVICE FOR TWO-SIDED COATING OF A PAPER WEB

Rauno Rantanen, Imatra, and Sivert Westergard, Järvenpää, both of Finland, assignors to Oy Wärtsilä Ab, Helsinki, Finland

Filed Feb. 28, 1986, Ser. No. 834,559
Claims priority, application Finland, Mar. 7, 1985, 850917
Int. Cl.[4] B05C 11/04, 5/02
U.S. Cl. 118—103 11 Claims



1. A system for coating liquid on both sides of an advancing indefinite length web, said device comprising:

applicator means for applying liquid to both sides of the indefinite length web;

a counter roller positioned downstream relative to said applicator means with respect to a direction of advancing of the indefinite length web whereby said counter roller receives the advancing indefinite length web;

a leveling means positioned adjacent said counter roller for providing a first nip between said leveling means and said counter roller through which the advancing indefinite length web passes; and

an auxiliary roller positioned adjacent said counter roller and downstream relative to said leveling means for providing a second nip between said auxiliary roller and said counter roller through which the advancing indefinite length web passes,

wherein said auxiliary roller has a diameter less than the diameter of said counter roller, and

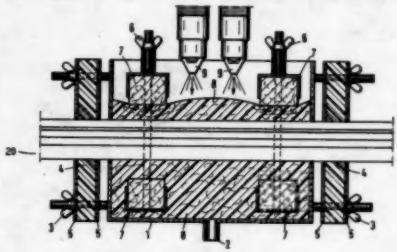
wherein said auxiliary roller has a harder surface compared to said counter roller.

4,712,507

## APPARATUS FOR THE APPLICATION OF A PRIMER TO A PLASTIC PROFILE OR THE LIKE

Wilhelm Helling, Schluchtweg 6, 4517 Hilter 1, Fed. Rep. of Germany

Filed Feb. 27, 1986, Ser. No. 833,980
Claims priority, application Fed. Rep. of Germany, Feb. 28, 1985, 3507104
Int. Cl.[4] B05C 1/06
U.S. Cl. 118—208 8 Claims



1. An apparatus for the application of a primer to a plastic profile or the like, characterized by a vat comprising: sealing elements provided with clearances for the passage of the plastic profile, a fibrous web material (8) in said vat and saturated with the primer to be applied, means (6, 7) for saturating the fibrous web material (8) with the primer, means for pressing the fibrous web material against the plastic profile and means defining an outlet opening (2), said vat having end faces and removable walls at said end faces lying perpendicular to the running direction of the plastic profile, each of said removable walls being formed of two spaced panels (5) having sealing cellular material (4) which is resistant to the primer solution lying therebetween, wherein the panels (5) with which the cellular material (4) lying therebetween are secured by threaded fastener means (3) and secured with said fastener means to the vat.

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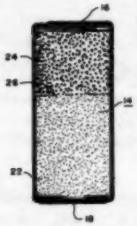
4,712,508

## LITTER MATERIAL FOR SMALL ANIMALS

Henry E. Lowe, 201 N. Edwards St., Cassopolis, Mich. 49031

Continuation-in-part of Ser. No. 132,285, Mar. 20, 1980, Pat. No. 4,448,151. This application Nov. 4, 1982, Ser. No. 439,034
Int. Cl.[4] A01K 1/015
U.S. Cl. 119—1 12 Claims



1. A package of litter material for small animals, comprising a container having elongated side walls and opposite end walls, a layer of relatively coarse particulate, liquid absorbent material disposed in one end of said elongated container and having an odor suppressant therein, a layer of relatively fine particulate, liquid absorbent material disposed in the other end of said elongaged container, the end wall adjacent said relatively fine

material being openable for discharging sequentially first said relatively fine particulate layer and then said relatively coarse particulate layer to form a multiple layer bed of litter with said relatively coarse particulate material forming the top layer of said bed.

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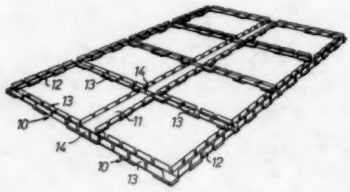
**4,712,509**

**ENCLOSURE CONSTRUCTIONS FOR FISH BREEDING**

**Knut Vangen, Bekkjarvikvn. 19, N-5084 Tertnes, Norway**

**Filed Jan. 31, 1985, Ser. No. 696,767**
**Claims priority, application Norway, Feb. 1, 1984, 840376**
**Int. Cl.[4] A01K *61/00***
**U.S. Cl. 119—3** **7 Claims**




1. An enclosure construction for fish breeding comprising
a plurality of longitudinal frame members;
a plurality of transverse frame members hingedly coupled with said longitudinal frame members to define at least two rows of rectangular frames;
a plurality of junction-forming frame members, each said junction forming frame member being pivotally connected between and to a pair of aligned transverse frame members and pivotally connected between and to a pair of aligned longitudinal frame members;
a plurality of frameworks, each said framework being secured to and extending from a respective junction-forming frame member to a point under an adjacent longitudinal frame member; and
means securing each framework to said adjacent longitudinal frame member to laterally stabilize said adjacent longitudinal frame member.

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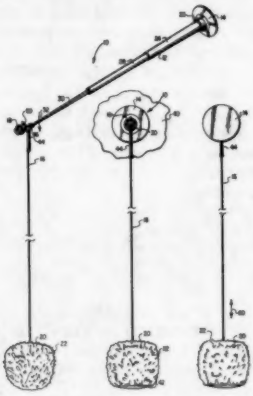
**4,712,510**

**EXPANDABLE WAND PET TOY**

**Suh Tae-Ho, Osaka, Japan, assignor to Fritz Chemical Company, Dallas, Tex.**

**Filed Jul. 28, 1986, Ser. No. 890,039**
**Int. Cl.[4] A01K *15/02***
**U.S. Cl. 119—29** **5 Claims**

1. A pet toy comprising:
a telescoping wand including first, second and third telescoping sections adapted for retraction one into the other for storage and expansion one from the other;
said first section of said wand having a diameter greater than the diameter of the other two sections and being substantially rigid in a longitudinal direction for providing structural rigidity to said wand structure and adapted for receiving said other two sections in concentric alignment therewithin;
said second section of said wand having a substantially thick wall construction, formed of material substantially similar to that of said first section, and having longitudinal rigidity for supporting said third section outwardly thereof;
said third section of said wand being relatively narrow in cross-section, of resilient flexibility for facilitating the suspension of said pet interaction object therebeneath and formed of material substantially similar to that of said first section;
said third section of said wand being of solid construction manifesting resilient flexibility and formed with an aperture on the outer end thereof adapted for receipt of said elastic tether therethrough for securement to said wand;
means for mounting said first section of said wand to a vertical surface;
a pet interaction object suspended from a distal end of said wand; and



an elastic tether secured to said distal end of said wand and to said object for providing movement of said pet interaction by the elasticity of said tether and said flexibility of said wand.

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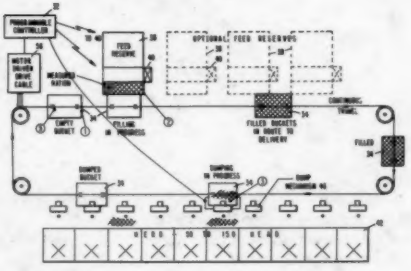
**4,712,511**

**PROGRAMMED MIX AND DELIVERY SYSTEM**

**Donald D. Zamzow, P.O. Box 358, and George L. Gorski, P.O. Box 358, both of Wausau, Wis. 54401**

**Filed Aug. 15, 1985, Ser. No. 765,945**
**Int. Cl.[4] A01K *5/02***
**U.S. Cl. 119—51 R** **20 Claims**



6. Apparatus for providing a specified ration to a specific stall comprising:
delivering means;
programmable control means programmed for outputting signals for controlling said delivering means to deliver said specified ration to the specific stall;
said delivering means including:
container means for receiving said specified ration and movable among a plurality of stalls for delivering said specified ration only to said specific stall,
motive means connected for receiving said signals from said programmable control means and for moving said container means to a first location to receive said specified ration and to a second location including the stalls, and
discharge control means responsive to said signals from

said programmable control means for discharging said container means of said specified ration only at said specific stall.

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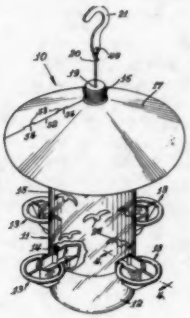
4,712,512

## BIRD FEEDER MADE FROM A PLASTIC BOTTLE, INCLUDING APPARATUS THEREFOR AND A METHOD OF MAKING

Bernhard Schreib, 2465 S. 170th St., New Berlin, Wis. 53151, and John K. Schreib, W299S4807 Hwy. 83, Mukwonago, Wis. 53149

Filed Aug. 1, 1986, Ser. No. 891,657
Int. Cl.[4] A01K *39/01*
U.S. Cl. 119—52 R 26 Claims



1. A combination of apparatus components cooperative for converting a plastic bottle into a bird feeder for a bottle being of the type having a closed sidewall and open neck portion being thread-engageable by a closure cap, said combination comprising:

sleeve means adapted to fit around and cover a portion of the sidewall of a plastic bottle;

tool means capable of piercing and slitting the sidewall of a bottle to create at least one generally H-shaped cut-out slot through the sidewall;

a feeder tray means having an open trough-like portion and capable of being inserted into the at least one H-shaped cut-out slot to be held by the sidewall of a bottle thereat;

cover means formed to have a central opening and a conic-like umbrella shape whereby the central opening may receive therethrough the neck portion of the plastic bottle;

cap washer means capable of being inserted interiorly of a closure cap when a closure cap is thread engaged to the neck portion of a plastic bottle;

support hook means capable of supporting a plastic bottle filled with bird seed and,

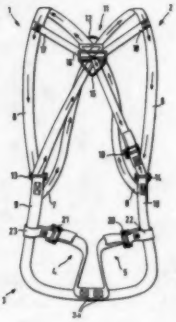
line means for supportively communicating at one end with said cap washer means through said closure cap and for connection at an other end to the support hook means whereby the support hook means may supportively communicate with the cap washer means and thereby be capable of supporting a bird feeder made by the combination of apparatus components for converting a plastic bottle.

4,712,513

## SUSPENSION HARNESS

Frank Huppertsberg, Wuppertal, Fed. Rep. of Germany, assignor to Gebr. Wahlefeld GmbH & Co. KG, Krefeld-Linn, Fed. Rep. of Germany

Filed Apr. 21, 1986, Ser. No. 854,396
Claims priority, application Fed. Rep. of Germany, Apr. 22, 1985, 8511916[U]
Int. Cl.[4] A62B *35/00*; A63B *79/00*
U.S. Cl. 119—96 15 Claims



1. In a suspension harness with adjustable shoulder straps which pass through a plate at a rear part of the harness having a suspension eye and are connected to a seat strap with adjustable leg straps at a front part of the harness, the improvement wherein:

said shoulder straps are formed by a single continuous belt passing in two directions through said plate at said rear part of the harness and passing additionally through a plate at the front part of the harness located generally opposite the plate at the rear part;

said belt is provided with means for adjusting the effective length thereof; and

said seat strap has loops at opposite ends thereof through which respective passes of said belt are looped at opposite sides of the harness.

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4,712,514

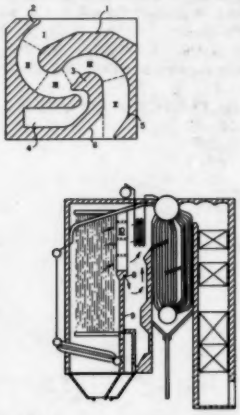
## FLUIDIZED BED BOILER AND HIGH TEMPERATURE SEPARATORS USED THEREIN

Zhang Xu-Yi; Yue Guangxi, and Zheng Qiayu, all of Beijing, China, assignors to Qinghua University, Beijing, China

Filed Sep. 5, 1986, Ser. No. 903,935
Int. Cl.[4] F22B *1/00*
U.S. Cl. 122—4 D 6 Claims

1. A fluidized bed boiler comprising a furance section, a plurality of separators disposed adjacent said furnace section for receiving flue gases from said furnace section and separating fine particulate material from said gases, each separator comprising a casted block having an curved inlet passage formed therein, a portion of said solid particles being forced against a curved wall portion of said inlet passage by centrifugal forces to separate said solid particles from said gases, said block including partition means for dividing the other end portion of said passage into two branch passages, a wall portion of one of said branch passages being coextensive with said curved wall portion to receive said separated solid particles, the other branch passage adapted to receive the separated gases and discharge said gases from an end thereof extending flush with a second surface of said block, the discharge end of the other branch passage of a portion of said separators extending perpendicular to said second surface and the discharge end of the other branch passage of the remaining portion of said separators extending at an angle to said second surface and said

separators are stacked in a vertical direction adjacent said furnace section, with the perpendicularly extending and the



angularly extending discharge ends of their respective other branch passages extending in an alternating relationship.

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**4,712,515**

## DEVICE FOR EVACUATING INTO THE AMBIENT AIR COMBUSTION PRODUCTS FROM A CONDENSATION BOILER

**Francois Couprie, 30, rue des Haies, 75020 Paris, France**

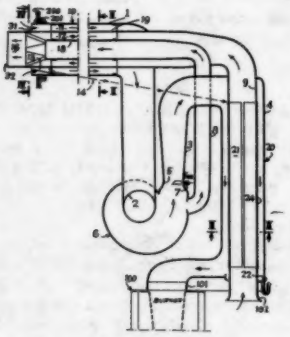
**Continuation of Ser. No. 655,575, Sep. 28, 1984, Pat. No. 4,640,232. This application Jul. 11, 1986, Ser. No. 884,560**

**Claims priority, application France, Sep. 30, 1983, 83 15657**

**The portion of the term of this patent subsequent to Feb. 3, 2004, has been disclaimed.**

**Int. Cl.[4] F22B *1/18*; F24B *7/04***

**U.S. Cl. 122—7 R** **6 Claims**



1. In a device for evacuating into the ambient air combustion products from a condensation boiler, in which at least one downstream section of a conduit for evacuating the combustion products is coaxial to a conduit for admission of the combustion air necessary for a burner of said boiler, and a fraction of the air collected in said admission conduit is returned towards the outside, the improvement which includes:

an opening for suction of the combustion air and for rejection of the combustion products into the ambient air;

means for returning a fraction of the collected air to the outside comprising a central tube coaxial to said downstream section of the conduit for evacuating the combustion products;

said conduit for admission of the combustion air surrounding said downstream section of the conduit for evacuating the combustion products;

said downstream section of the conduit for evacuating the combustion products, said coaxial section of the admission conduit and said means for returing to the outside a fraction of the collected air defining a first heat exchanger;

means for diluting the combustion products with said fraction of collected air located in the vicinity of said opening;

a second heat exchanger between said first heat exchanger and said boiler whereby the combustion products issuing from said boiler further heat the combustion air heated in said first heat exchanger, said second heat exchanger having a trickling water surface over which water trickles to increase the humidity of the combustion air already reheated; and

collecting means inside said first heat exchanger, adjacent the outlet of the conduit for evacuating the combustion products, to collect the condensates formed in said conduit and duct means external to said first heat exchanger connected at one end to said collecting means and connected at its opposite end to said trickling water surface to return the collected condensates from said collecting means into said second heat exchanger to constitute the trickling water intended to increase the humidity of the preheated combustion air.

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**4,712,516**

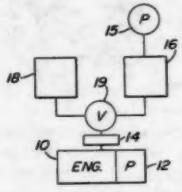
## FUEL SUPPLY FOR A ROTARY PISTON ENGINE

**H. Alfred Eberhardt, Paoli, Pa., assignor to Hale Fire Pump Company, Conshohocken, Pa.**

**Division of Ser. No. 358,547, Mar. 15, 1982, Pat. No. 4,570,605. This application Sep. 25, 1985, Ser. No. 768,688**

**Int. Cl.[4] F02B *75/12***

**U.S. Cl. 123—1 A** **4 Claims**




1. A fuel supply for an internal combustion engine having a fuel inlet means for delivering a fuel-air mixture to the engine combustion chamber comprising:

means providing a contained supply of a running fuel and for delivering said fuel to the fuel inlet means for the use in the normal operation of the engine, said running fuel having a relatively low volatility,

and pump means including a small air pump for pressurizing said contained running fuel supply to provide a simple fuel injection system for said engine.

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**4,712,517**

## CYLINDER BLOCK STRUCTURE FOR MULTICYLINDER INTERNAL COMBUSTION ENGINES

**Nobuo Anno, and Takeo Arai, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 12, 1985, Ser. No. 807,995**

**Claims priority, application Japan, Dec. 13, 1984, 59-263665; Dec. 13, 1984, 59-189439[U]**

**Int. Cl.[4] F02B *75/18***

**U.S. Cl. 123—41.74** **3 Claims**

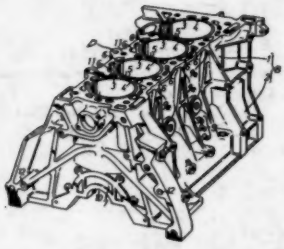
1. A cylinder block structure of a light alloy for use in a multi-cylinder internal combustion engine, comprising:

a cylinder-defining portion having a plurality of cylinder

bores, a water jacket defined in surrounding relation to said cylinder bores and a deck for attachment to a cylinder head;

a crankcase-defining portion integrally formed with said cylinder-defining portion and having a plurality of integral journal walls spaced in the direction in which said cylinder bores are arranged;

means defining concavities in opposite sides of said cylinder- and crankcase-defining portions between the adjacent cylinder bores, said concavities lying between said water jacket and said journal walls; and



a plurality of reinforcing rib systems projecting from said opposite sides with each rib system surrounding one of said concavities, each of said reinforcing rib systems extending substantially parallel to the central axes of said cylinder bores and having an upper end terminating short of said deck and each said reinforcing rib system having a substantially A-shaped configuration including a pair of laterally spaced substantially vertical ribs positioned one on each side of said concavities and a substantially horizontal rib interconnecting said vertical ribs.

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**4,712,518**

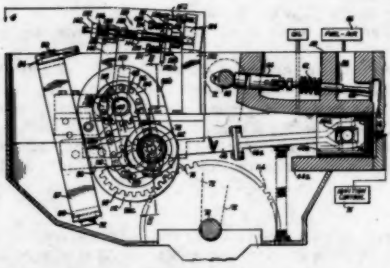
## POWER OUTPUT MECHANISM FOR AN INTERNAL COMBUSTION ENGINE

**Fred L. Johnson, New Bern, N.C., assignor to R. L. Thomas and W. J. Rouse, both of New Bern, N.C., a part interest**

**Filed Oct. 18, 1985, Ser. No. 789,018**

**Int. Cl.[4] F02B 75/32**

**U.S. Cl. 123—48 B** **25 Claims**



1. Apparatus for converting between reciprocating movement and rotational movement comprising:

(a) a member constrained so as to undergo reciprocating movement along a first axis between a top dead center position and a bottom dead center position;

(b) an output shaft mounted so as to undergo rotational movement about its longitudinal axis; p1 (c) a connecting rod having a first end attached to the member and a second end;

(d) guide means attached to the second end of the connecting rod to constrain the second end to move in a closed loop path, the guide means comprising:

(i) means defining a cam track forming the closed loop path, the cam track including the pair of generally parallel, substantially straight portions disposed at an angle of greater than 90°, but less than 180° to the first axis, and, a first portion movable with respect to a second portion so as to vary the length of the closed loop path; and,

(ii) a cam follower attached to the second end of the connecting rod and extending into the cam track so as to constrain the second end to follow the closed loop path defined by the cam track;

(e) driving means interconnecting the second end of the connecting rod and the output shaft so as to cause the output shaft to rotate as the second end travels along the closed loop path, the drive means including a closed loop drive member; and,

(f) means to move the first portion of the cam track with respect to the second portion so as to vary the length of the closed loop path and to maintain a predetermined tension on the closed loop drive member.

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**4,712,519**

## INTAKE MANIFOLD FOR A THREE-CYLINDER AIR-FUEL MIXTURE SUCTION TYPE ENGINE

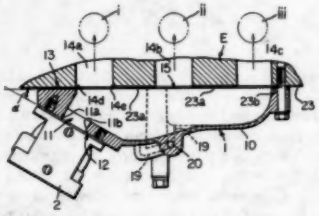
**Kooichi Sugahara; Yoshio Shinno, and Kiyoharu Kimoto, all of Sakaishi, Japan, assignors to Kubota Ltd., Osaka, Japan**

**Filed Feb. 28, 1986, Ser. No. 834,789**

**Claims priority, application Japan, Mar. 11, 1985, 60-35270[U]**

**Int. Cl.[4] F02B 75/18**

**U.S. Cl. 123—52 M** **5 Claims**




1. An intake manifold for a three-cylinder air-fuel mixture suction type engine having three engine intake ports, said intake manifold comprising a body defining an elongate manifold chamber, said body having a chamber inlet opening formed in a first end wall portion thereof, said first end wall portion adapted to receive a carburetor in fluid communication with said inlet opening, said body being open longitudinally along a back face portion so as to define an outlet opening sufficient to extend over all three intake ports of a three-cylinder engine, said inlet opening being directed longitudinally toward an opposite end wall portion of said body and obliquely toward said back face portion, said first end wall portion adapted to receive the carburetor so that the carburetor is aligned obliquely at an acute angle with respect to a plane defined by said back face portion of said body;

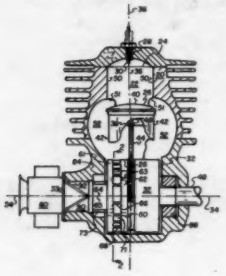
said body configured to be received by a planar cylinder head face so that said chamber inlet opening is located adjacent the rearward one of the three intake ports and said opposite end wall portion is adjacent the forward one of the three intake ports, a rearward body edge portion along said chamber inlet opening being located rearward of a rearward engine edge portion along the rearward intake port, a forward body edge portion along said chamber inlet opening being located longitudinally between the rearward and a forward engine edge portion along the rearward intake port.

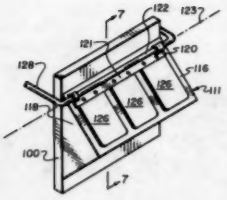
**4,712,520**

## CRANK CASE COMPRESSOR UNIT FOR A TWO CYCLE ENGINE

**John Pasquin, 3254 S. Barney, West Valley City, Utah 84119**

**Filed Jul. 25, 1986, Ser. No. 889,347**
**Int. Cl.[4] F02B *33/04***
**U.S. Cl. 123—73 S** **7 Claims**





1. In a two-cycle gasoline engine comprising a engine body, a cylinder in the body having a closed end and an open end, an enclosed crankcase in the body communicating with said open end, a crankshaft extending through the crankcase and rotatably mounted therein, a piston reciprocatively mounted in the cylinder, a connecting rod connecting the piston and the crankshaft, a carburetor positioned exterior of said engine body, an intake duct in said engine body communicating with the cylinder through which a combustible mixture enters said cylinder when said piston is adjacent said open end, an inlet port in said body communicating said carburetor with said crankcase, the improvement comprising:

a compressor means mounted within said crankcase adapted for continuously pressurizing a combustible mixture within said crankcase as said mixture is received from said carburetor, while said engine is in operation,

said compressor means including:

a fly wheel, having a periphery and an axis of rotation, said flywheel being mounted on said crankshaft and made rotatable therewith, said flywheel having a plurality of vanes mounted thereon, said vanes extending from a central regioin of said flywheel outwardly to said periphery of said flywheel;

wherein said inlet port is positioned proximate said axis of rotation of said flywheel, said combustible mixture being directed initially to a central region of said flywheel and thereafter directed by said vanes outwardly to said periphery of said flywheel;

a reed-type valve mounted in said inlet port for allowing a one-way directional flow of combustible mixture, said reed type valve includng:

a support frame adapted for sealing said inlet port, said support frame defining at least one aperture therein:

at least one cover plate fabricated of a resilient material pivotedly mounted on said support frame over said aperture, said cover plate being dimensioned to cover and seal said aperture;

each said cover plate being mounted on a hinge; said hinge being pivotedly mounted on said support frame; an angular displacement of said hinge about its axis of rotation facilitating a coordinated sealing and unsealing of said support frame aperture by a selected displacement of said cover plate;

wherein said combustible mixture being directed through said inlet port into said vaned flywheel, is constantly compressed within said crankcase due to the rotation of said flywheel within said crankcase.

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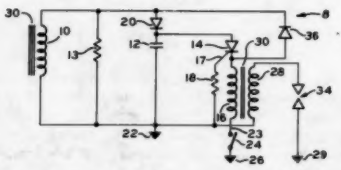
**4,712,521**

## IGNITION SYSTEM

**Kenneth W. Campen, Kiel, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.**

**Filed Jan. 15, 1987, Ser. No. 3,851**
**Int. Cl.[4] F02P *1/00*; F02B *77/00***
**U.S. Cl. 123—149 C** **14 Claims**



1. An electronic ignition system for an internal combustion engine comprising:

a ferromagnetic core;

a plurality of coils mounted on said core and including a primary coil and a secondary coil which are inductively coupled by said core;

permanent magnet means rotatably mounted for movement past said core to induce varying flux densities therein;

an electronic switching circuit connected to said primary coil to control the current flow therethrough, said electronic switching circuit including an electronic switching device and a capacitor which is charged by the voltage developed by said moving permanent magnet in one of said plurality of coils and which is discharged through said electronic switching device;

a first ground connection for said electronic switching circuit;

a second ground connection for said primary coil; and

a cut off switch connected between one end of said primary coil and said second ground connection, whereby, when said cut off switch is opened, current flow through said primary coil is prevented and triggering of said electronic switching device continues as the engine coasts to a stop.

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**4,712,522**

## METHOD AND APPARATUS FOR CONTROLLING AIR-FUEL RATIO IN INTERNAL COMBUSTION ENGINE

**Katsushi Anzai; Osamu Harada; Toshio Suematsu, and Yuji Takeda, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed Aug. 23, 1985, Ser. No. 768,830**
**Claims priority, application Japan, Aug. 27, 1984, 59-176695; Aug. 27, 1984, 59-176696; Aug. 27, 1984, 59-176691**
**Int. Cl.[4] F02D *41/06***
**U.S. Cl. 123—179 L** **16 Claims**

3. A method for controlling an air-fuel ratio in an internal combustion engine, comprising the steps of:

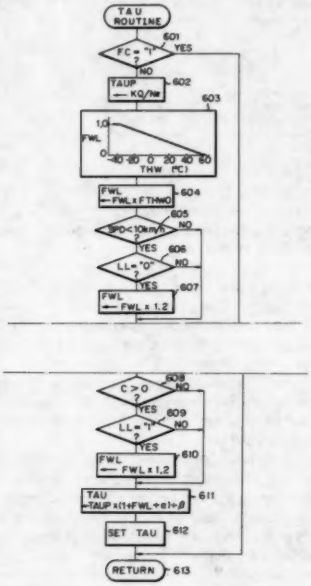
detecting a temperature of an engine coolant;

determining whether said engine is in a cranking state;

calculating a fuel enrichment amount in accordance with the detected temperature of the engine coolant when said engine is in said cranking state and said temperature of said engine coolant when said engine is not in said cranking state; and

supplying fuel to said engine in accordance wtih said enrichment amount.

5. A method for controlling the air-fuel ratio in an internal combustion engine, comprising the steps of:







detecting a temperature of an engine coolant;

detecting when a starter of the engine is turned on;

calculating a fuel enrichment amount in accordance with a currently detected temperature of the engine coolant and a temperature detected during a time when said starter is on; and

incrementing fuel to be supplied to the engine by the fuel enrichment amount.

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**4,712,523**

## AIR-FUEL MIXTURE INTAKE PIPE FOR INTERNAL COMBUSTION ENGINE

**Tatsuhiko Matsubayashi, Hachioji, Japan, assignor to Kioritz Corporation, Tokyo, Japan**

**Filed May 19, 1986, Ser. No. 864,093**

**Claims priority, application Japan, Jun. 4, 1985, 60-83451[U]**

**Int. Cl.⁴ F02M *29/04, 33/02***

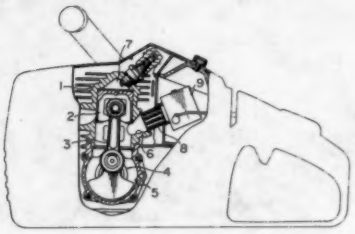
**U.S. Cl. 123—188 M** **3 Claims**

1. An air-fuel mixture intake pipe for an internal combustion engine, adapted to communicate a carburetor of the internal combustion engine and an intake port of a cylinder thereof, said intake pipe comprising

means for containing stagnate excess fuel during sudden deceleration and evaporation said excess fuel during re-acceleration so as to be gradually supplied to said engine, said means including

a wall on an interior of the intake pipe which a plurality of projection rows are molded integrally therewith to provide a hollow, elongated passage for said air-fuel mixture between said carburetor and intake port, each said projection being composed of a plurality of projections spaced from each other extending along and slightly into said interior of said wall of the intake pipe and, said projections being arranged in a circumferential direction and spaced from each other with said rows extending in a longitudinal direction of the intake pipe, and

a space defined between each adjacent pair of said rows of projections by a longitudinal groove formed in said inner wall of the intake pipe;




wherein when said engine is suddenly decelerated, said excess fuel in said air-fuel mixture stagnates between said projections, and when said engine is re-accelerated, the stagnant fuel evaporates from said projections and flows along said longitudinal grooves to be gradually supplied for combustion.

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**4,712,524**

## FUEL INJECTION SYSTEM

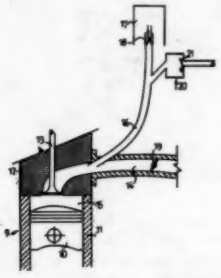
**Darren A. Smith, Scarsborough, and Ian R. Thompson, Duncraig, both of Australia, assignors to Orbital Engine Company Proprietary Limited, Balcatta, Australia**

**Filed May 23, 1986, Ser. No. 866,294**

**Claims priority, application Australia, May 24, 1985, PH00730**

**Int. Cl.⁴ F02M *67/00***

**U.S. Cl. 123—198 A** **38 Claims**

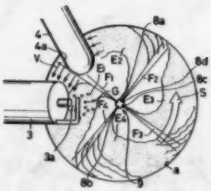


1. A method of periodically delivering units of liquid fuel to an internal combustion engine having a fuel metering device for providing individual metered quantities of fuel for supply to the engine, and a conduit communicating the fuel metering device to the engine, said method comprising applying an individual gas pulse to each respective metered quantity of fuel to convey the fuel from the fuel metering device through the conduit to the engine, and establishing a secondary gas flow through at least part of the conduit to the engine at least part of the time between successive gas pulse applications to reduce cycle to cycle variations in fuel deliveries.

## 4,712,525
## COMBUSTION CHAMBER OF INTERNAL COMBUSTION ENGINE

Shiro Ishida, Fujisawa, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

Filed Nov. 26, 1986, Ser. No. 935,357
Claims priority, application Japan, Nov. 30, 1985, 60-270288
Int. Cl.[4] F22B *15/00, 21/30*
U.S. Cl. 123—263 6 Claims



1. A combustion chamber of an internal combustion engine, comprising:
- a combustion chamber with a swirl formed therein;
- a fuel injecting nozzle means for feeding fuel in an atomized condition toward an inner wall of said combustion chamber with a swirl formed therein;
- a glow plug means for vaporizing the fuel fed in an atomized condition, said glow plug means being disposed on an upstream side of the swirl near the line of injection of the fuel; and
- a spark plug means for igniting the vaporized fuel, said spark plug means being disposed downstream of the swirl in proximity to said glow plug means.

## 4,712,526
## PISTON WITH TURBINE FAN FOR USE IN INTERNAL COMBUSTION ENGINES

David Caughran, 3743 Mt. Blance Cir., Anchorage, Ak. 99508

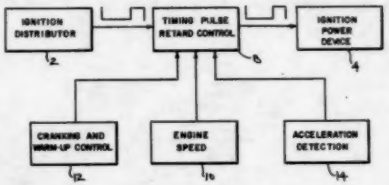
Filed Jan. 23, 1986, Ser. No. 821,893
Int. Cl.[4] F02F *3/24;* F02M *29/00*
U.S. Cl. 123—307 13 Claims

1. A piston, mounted in a cylinder having spark means, for use in an internal combustion engine comprising:
- A. a cylindrical casing, having a hollow cavity therein with closed side and bottom walls;
- B. a top portion, having a perimeter fixedly attached to said hollow cavity of said cylindrical casing, thereby forming an integral unit;
- C. turbine blade means fixedly mounted so as to be positioned inside the hollow cavity of said cylindrical casing;
- D. air inlet means, installed in said top portion to allow entry of air and fuel, in a mixture, into said hollow cavity of said cylindrical casing;
- E. air outlet means also installed in said top portion to allow exit of the air fuel mixture out of said hollow cavity after said air fuel mixture has been swirled by said turbine blade means.

## 4,712,527
## ENGINE IDLE STABILIZATION TIMING CIRCUIT

Richard E. Staerzl, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed May 22, 1986, Ser. No. 866,163
Int. Cl.[4] F02P *5/145*
U.S. Cl. 123—418 6 Claims

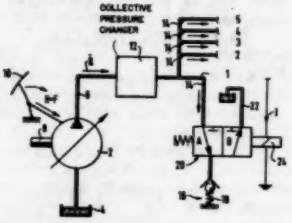



1. In an internal combustion engine having ignition timing means supplying ignition timing pulses according to a baseline timing curve as a function of engine speed, a timing circuit for stabilizing idling of said engine comprising:
- delay means for variably delaying said ignition timing pulses relative to a top dead center position of said engine to retard engine timing from said baseline curve;
- engine speed responsive means coupled to said delay means for varying the relative timing delay of said pulses according to engine speed;
- acceleration detection means comprising throttle position responsive means coupled to said delay means for decreasing said relative timing delay to advance engine timing for quick acceleration;
- engine temperature responsive means coupled to said delay means for decreasing said relative timing delay when engine temperature is below a given value; and
- disabling means coupled to said acceleration detection means and responsive to a second predetermined engine speed higher than said first mentioned predetermined speed and disabling said acceleration detection means at engine speeds above said second predetermined speed.

## 4,712,528
## FUEL INJECTION SYSTEM

Wolfgang Schaffitz, Munich, Fed. Rep. of Germany, assignor to Institut für Motorenbau Professor Huber e.V., Munich, Fed. Rep. of Germany

Continuation of Ser. No. 122,951, Feb. 20, 1980, abandoned. This application Feb. 26, 1982, Ser. No. 352,918
Claims priority, application Fed. Rep. of Germany, Feb. 24, 1979, 2907279; Mar. 9, 1979, 2909307; Apr. 12, 1979, 2914966; May 12, 1979, 2919229
Int. Cl.[4] F02M *39/00*
U.S. Cl. 123—446 27 Claims




1. A fuel injection system for dosing and atomizing fuel into each cylinder of an internal-combustion engine, comprising:
- (a) an injection nozzle for each cylinder of the engine for atomizing the fuel into the respective cylinder;
- (b) a continuously-operating, controllable-flow-rate fuel

pump for continuously pressurizing and dosing the fuel per unit of time from said fuel pump up to and through every injection nozzle for atomizing the fuel into the respective cylinder thereby delivering a quantity of the fuel required by the fuel injection system per said unit of time;

(c) fuel path means for forming a fuel path and collective pressure chamber for the entire fuel flow from the fuel pump to every injection nozzle;

(d) at least one timing means associated with each injection nozzle for opening, and controlling the timing of at least the opening of to each injection nozzle; and

(e) means for setting the controllable flow rate of the fuel pump to the sum of the fuel quantities to be injected into every cylinder of the engine per unit of time such that a return flow of the fuel quantities into the fuel injection system is eliminated.

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**4,712,529**

## AIR-FUEL RATIO CONTROL FOR TRANSIENT MODES OF INTERNAL COMBUSTION ENGINE OPERATION

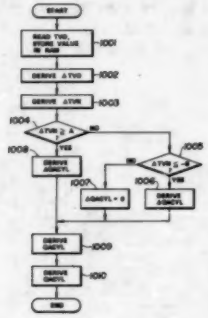
**Katsunori Terasaka, Yokosuka; Hiroshi Sunbuichi, and Toyoaki Nakagawa, both of Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Jan. 8, 1987, Ser. No. 1,441**

**Claims priority, application Japan, Jan. 13, 1986, 61-5838**

**Int. Cl.[4] F02D *41/10***

**U.S. Cl. 123—492** **6 Claims**



1. A method of operating an internal combustion engine comprising the steps of:

sensing a parameter which varies with the amount of air being inducted into a cylinder of the engine and producing a first signal indicative thereof;

detecting a parameter which varies with the throttling of the induction system and producing a second signal indicative thereof;

monitoring said second signal to sense the initiation of transitory engine operation;

determining a first correction value by:

(i) modifing the change in said second signal with respect to engine speed, and

(ii) modifying a value indicative of the amount of air being inducted into the cylinder at the instant that the initiation of said transitory operation is detected with the value derived by modifying the change in said second signal with respect to engine speed;

determing a second correction value by adding a value derived by multiplying (a) the change in said first signal by a factor which varies with engine speed by (b) the instant value of said first signal; and

summing the first and second correction values to derive an accurate approximation of the air being inducted into the cylinder.

**4,712,530**

## HYDRAULIC ADJUSTING ARRANGEMENT FOR AN INJECTION PUMP

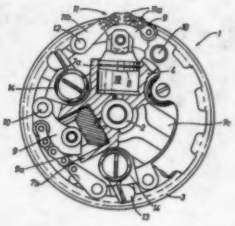
**Wolfgang Rapp, deceased, late of Esslingen, Fed. Rep. of Germany (by Gisela Rapp, administratrix); Günther Häfner, Berglen, and Ulrich Letsche, Stuttgart, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany**

**Filed Nov. 4, 1985, Ser. No. 794,286**

**Claims priority, application Fed. Rep. of Germany, Nov. 2, 1984, 3440055**

**Int. Cl.[4] F02M *59/20***

**U.S. Cl. 123—502** **12 Claims**



1. A hydraulic timing adjustment arrangement linking a primary and a secondary part of a transmission for driving a fuel injector system for a motor vehicle internal combustion engine, said arrangement comprising:

a flexible connector means having one section fixed to move with the primary part and another section fixed to move with the secondary part movable means on the secondary part adjacent to said connector means for deforming said flexible connector means radially to effect a circumferential rotation of the secondary part with respect to the primary part.

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**4,712,531**

## APPARATUS FOR ADJUSTING SPECIFIC VOLUME OF INTAKE AIR FOR ENGINE

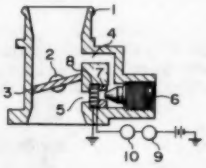
**Isamu Ishizawa, and Sigeo Tamaki, both of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed May 8, 1985, Ser. No. 731,734**

**Claims priority, application Japan, May 18, 1984, 79-100767**

**Int. Cl.[4] F02M *15/00, 23/14***

**U.S. Cl. 123—556** **11 Claims**




1. In an apparatus for adjusting a specific volume of intake air for an engine of the type having a by-pass passage which by-passes a throttle valve for adjusting the specific volume of intake air flowing through an intake passage, and an orifice defined by an adjusting valve body and a valve seat and adapted to adjust the specific volume of intake air passing through said by-pass passage, the improvement comprising a heating element provided on a downstream side of said orifice in said by-pass passage, said heating element allowing said intake air to pass therethrough, said heating element is formed so as to have a lattice shape, and wherein said valve seat is formed so as to have a sharp-edged shape, said latticeshaped heating element being integrated with said valve seat.

**4,712,532**

## CRANKCASE EMISSION CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

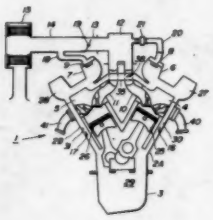
**Syouzabu Ura, Fujisawa; Makoto Yasuda, and Yoshitaka Ooki, both of Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Japan**

**Filed Oct. 20, 1986, Ser. No. 920,439**

**Claims priority, application Japan, Oct. 21, 1985, 60-160963[U]**

**Int. Cl.[4] F02B *25/02***

**U.S. Cl. 123—572** **6 Claims**



**1.** A crankcase emission control system for a V-type internal combustion engine having first and second cylinder blocks, combustion chambers defined by the first and second cylinder blocks, an air intake passage leading to the combustion chambers, a throttle valve disposed in the air intake passage, first and second cylinder heads mounted on the first and second cylinder blocks respectively, first and second cam covers mounted on the first and second cylinder heads respectively, a first cam chamber defined by the first cylinder head and the first cam cover, a second cam chamber defined by the second cylinder head and the second cam cover, and a crank chamber, the system comprising:

(a) a first gas passage connecting the crank chamber to a point of the air intake passage downstream of the throttle valve via the first cam chamber;

(b) a second gas passage connecting the crank chamber to a point of the air intake passage upstream of the throttle valve via the second cam chamber;

(c) a control valve disposed in a segment of the first gas passage between the first cam chamber and the air intake passage, the control valve being responsive to a vacuum developed in the air intake passage downstream of the throttle valve; and

(d) a communication passage connecting the first and second cam chambers.

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**4,712,533**

## HIGH-SPEED BOW LIMBS

**Billy J. Cruise, 28494 Siesta La., Eugene, Oreg. 97402**

**Filed May 22, 1986, Ser. No. 866,391**

**Int. Cl.[4] F41B *5/00***

**U.S. Cl. 124—23 R** **16 Claims**

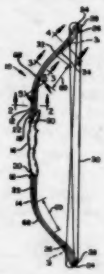
**1.** An archery bow having a pair of elongate limbs of laminated pre-stressed construction, each limb comprising:

(a) a back layer having a plurality of back layer laminae, each of said back layer laminae including a plurality of pre-stressed reinforcing fibers extending parallel with one another and longitudinally of said limb and being embedded in a resin matrix;

(b) a belly layer having a plurality of belly layer laminae, each of said belly layer laminae including a plurality of pre-stressed reinforcing fibers extending parallel with one another and longitudinally of said limb and being embedded in a resin matrix;

(c) a pair of opposite end portions and an intermediate portion located therebetween, between, said intermediate portion being free of any core material located between said belly layer laminae and said back layer laminae and substantially all reinforcing fibers present in said intermediate portion being pre-stressed; and

(d) all of said laminae being fixedly interconnected with one another in a pre-stressed arcuately curved configuration



with respective confronting faces of said laminae adhesively interconnected with one another over their entire confronting surfaces within each of said belly and back layers.

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**4,712,534**

## BALL THROWING MACHINE

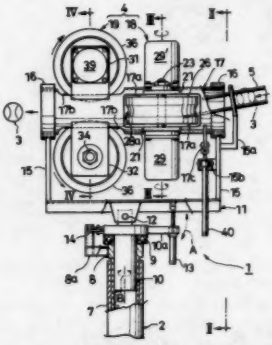
**Fujio Nozato, 33-20, Izuo 1-chome, Taisho-ku, Osaka 551, Japan**

**Filed Apr. 25, 1986, Ser. No. 855,574**

**Claims priority, application Japan, May 17, 1985, 60-106698**

**Int. Cl.[4] F41B *15/00***

**U.S. Cl. 124—78** **2 Claims**



**1.** A ball throwing machine including a pair of first counter-rotating rotary wheels having axes parallel to each other, at least one first motor driving said pair of first rotary wheels, means for feeding balls to said pair of first rotary wheels, each of said first rotary wheels having an arcuately grooved outer peripheral surface for nipping a ball fed therebetween and accelerating and propelling said ball forward of said pair of first rotary wheels along a free path substantially tangent to said wheels of said pair of first rotary wheels, a second pair of counter-rotating rotary wheels located in said ball propelling path and forwardly of said first rotary wheels with the tangents of the wheels of said second pair of wheels in substantial alignment with said free path, said second pair of rotary wheels having axes parallel to each other and substantially at right angle to said axes of said pair of first rotary wheel as view from said propelling path, each of said second rotary wheels having a linear peripheral outer surface, the outer linear peripheral outer surfaces of said second rotary wheels being substantially parallel to each other and to the axes of said second rotary wheels, at least one second motor driving said pair of second

rotary wheels, the arrangement being such that the ball accelerated and propelled by said first rotary wheels along said free path tangent to said pair of first wheels is caught by and nipped between the outer peripheral surfaces of said second rotary wheels, is further accelerated and is thrown forward and out of said ball throwing machine by said pair of second rotary wheels.

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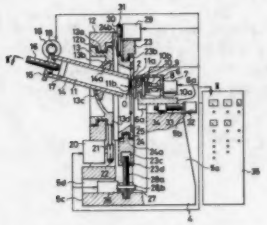
**4,712,535**

## METHOD AND APPARATUS FOR SEVERING WAFERS

**Masayasu Fujisawa, Ninomiya, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Jun. 4, 1986, Ser. No. 910,142**
**Claims priority, application Japan, Jul. 12, 1985, 60-152524**
**Int. Cl.[4] B28D *1/04***
**U.S. Cl. 125—13 R** **7 Claims**



1. A method of severing an end portion of an ingot into wafers and the like by means of a cutting tool, comprising the steps of

holding a front end portion of the ingot,

cutting the end portion of the ingot until a portion remains between a cut end surface from which a wafer is formed and the remainder of the ingot,

controlling the stress applied to a remaining portion between the cut end surface of the ingot from which a wafer is formed and the remainder of the ingot just before severing the cut end surface so as to pull the wafer at a right angle relative to the plane of the cut end surface,

severing the remaining portion between the ingot and the cut end surface to form the wafer,

moving the cut surface of the separated wafer toward the remainder of the ingot while rotating the wafer, and

pressing the wafer against the cutting tool to remove any undesired remaining material caused by the severing operation.

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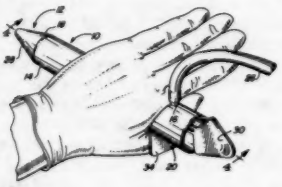
**4,712,536**

## RECTAL SPECULUM WITH OBTURATOR

**Robert A. Hawks, 3602 W. Danbury Dr., Glendale, Ariz. 85308**

**Filed Jan. 20, 1987, Ser. No. 4,600**
**Int. Cl.[4] A61B *1/12***
**U.S. Cl. 128—3** **20 Claims**



1. A rectal speculum for use with a colonic lavage machine, said speculum comprising:

an unobstructed main tube, said main tube including a distal end for insertion into a patient's rectum and a proximal end for connection to a waste discharge hose; and

a inlet tube for directing fluids into said main tube, said inlet tube having a diameter less than the diameter of said main tube, and intersecting said main tube at an obtuse angle with respect to the proximal end of said main tube so as to direct fluids away from said distal end of said main tube.

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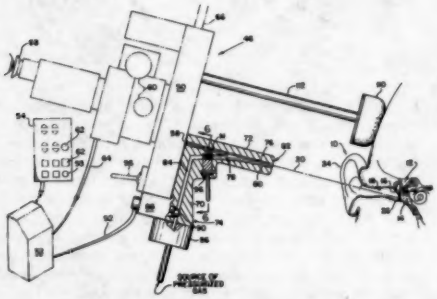
**4,712,537**

## APPARATUS FOR TREATING RECURRENT EAR INFECTIONS

**Daniel J. Pender, 325 E. Park Ave. - Suite 1, Long Beach, N.Y. 11561**

**Filed Aug. 13, 1986, Ser. No. 895,917**
**Int. Cl.[4] A61B *1/22***
**U.S. Cl. 128—9** **7 Claims**



1. An apparatus for treating ear infections comprising a body mounted on a turret and having a main bore extending linearly from a fixed opening through which a sighting and delivery of laser energy passes axially enabling the location and formation of a hole by vaporization of a selected target site on an eardrum, an auxillary bore connected at one end to a source of air under pressure and at its other end to said main bore, a breech block having a cylinder for receiving a missile to be positioned in said eardrum, said breech block being mounted in said body between an open position permitting loading of the missile therein and a closed position aligning the receiving cylinder in the breech block with the said auxiliary bore, and means for selectively controlling the passage of air through said auxiallary bore for propelling the missile into and through said main bore.

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**4,712,538**

## VIBRATORY SAUNA

**Laurie S. Hardie, 8 View Avenue, Surfers Paradise, Queensland, and Leonard J. Coleman, 5 Seafarer Court, Paradise Waters, Queensland, both of Australia (4217)**

**Continuation-in-part of Ser. No. 551,958, Nov. 15, 1983, Pat. No. 4,565,188. This application Sep. 4, 1985, Ser. No. 772,726**
**The portion of the term of this patent subsequent to Jan. 21, 2003, has been disclaimed.**
**Int. Cl.[4] A61H *29/00***
**U.S. Cl. 128—24.1** **47 Claims**

1. A vibratory sauna comprising:

a housing including a lower housing member and an upper closure member forming a cover rotatably connected to said lower housing member, said lower housing member including a base,

a support member mounted on said lower housing member oriented in a substantially horizontal plane adapted for supporting the torso of a person in a supine position,

head support means located adjacent to said lower housing member and outwardly of said closure member to form a longitudinal extension of said support member,

resilient mounting means positioned in said lower housing member for supporting said support member,

vibration means operatively connected to said support member for vibrating said support member,

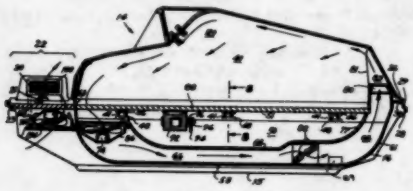
said cover member forming an upper compartment,

said lower housing member froming a chamber below said support member,

heating means for heating unheated air,

airflow generation means for forcing heated and unheated air, and

chamber means positioned within and mounted in said cham-



ber, said heating means being positioned in said chamber means, and said airflow generation means being associated with at least one inlet and at least one outlet of said chamber means, said chamber means being for receiving unheated air from said compartment at said at least one inlet and passing said unheated air to said at least one outlet back to said compartment in a flow of air creating a continuous closed circulation of air in said housing, said continuous closed circulation of air including a flow of heated air above said support member so as to contact the person lying thereon while said support member is adapted to be simultaneously vibrated.

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**4,712,539**

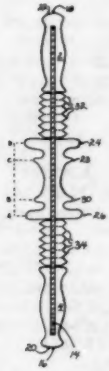
**PRESSURE APPLYING APPARATUS**

**Jung J. Kim, 1916 Stanley Ave., Rockville, Md. 20851**

**Filed Jun. 26, 1985, Ser. No. 748,827**

**Int. Cl.[4] A61H *15/00***

**U.S. Cl. 128—57** **7 Claims**



1. In an apparatus for use in the related sciences of accupressure, chiropractic and massotherapy, having rolling elements supported on a central shaft disposed between two handles fixedly connected to opposite ends of the central shaft, the improvement comprising:

a first accupressure means for back-massaging comprising a rolling mid-portion, rotatably supported on the shaft, and having two widely spaced, relatively large diameter outer discs defining a first rolling element for applying pressure to the back area of a user, and second accupressure means for neck-massaging comprising a long concave portion axially outwardly terminated by two inner discs having a diameter smaller than the outer discs, and being spaced slightly inwardly from the outer discs, defining a second rolling element for applying pressure to the neck area of a user, the inner discs being separated by the long concave portion which has a radially inwardly uniformly curved surface which is concave in cross-section, the first means for back massaging and the second means for neck massaging comprising a unitary rolling element,

two accupressure means for foot-massaging comprising two opposite independently rolling side portions, each being independently rotatably supported on the shaft between flat proximal ends of the handles and flat distal ends of the mid-portion and having a plurality of radially extending thin outer edge rolling surfaces sloping inwardly to solid inner cores and defining third and fourth independently rolling elements for applying pressure to the foot area of a user,

the handles being solid and distal ends of the handles being rounded to provide blunt, pressure applying means for applying pressure to various points and areas of the body by applying light thrusts to the body.

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**4,712,540**

**CERVICAL COLLAR**

**Kevin M. Tucker, and Donald Peeler, both of Toledo, Ohio, assignors to Jobst Institute, Toledo, Ohio**

**Continuation of Ser. No. 734,981, May 16, 1985, abandoned. This application Mar. 2, 1987, Ser. No. 21,629**

**Int. Cl.[4] A61F *5/04***

**U.S. Cl. 128—76 R** **22 Claims**

1. A cervical collar comprising:

a flexible panel having an inner surface, an outer surface and a top surface interconnecting said inner and outer surfaces, said panel being formable from a flat configuration to a neck encircling band configuration;

a chin support member connected to said panel and pivotable relative thereto from a first non-chin support position to a second chin support position, said member in said first position located adjacent to said outer surface of said panel, and responsive solely to formation of said panel into said neck encircling band configuration said chin support member pivoting over said top surface into said second position extending across said neck encircling band for providing support to a wearer's chin; and

means for retaining said panel in said neck encircling band configuration.

4,712,541

## BONE NAIL AND INSTRUMENTS FOR THE TREATMENT OF FRACTURES

Hans E. Harder, Probsteierhagen, and Hermann Kramer, Neumunster, both of Fed. Rep. of Germany, assignors to Howmedica International, Inc., Kiel, Fed. Rep. of Germany

Continuation of Ser. No. 493,887, May 12, 1983, abandoned. This application Dec. 19, 1986, Ser. No. 943,970

Claims priority, application Fed. Rep. of Germany, May 18, 1982, 8214493[U]; European Pat. Off., Mar. 18, 1983, 83102694.3

Int. Cl.[4] A61F 5/04

U.S. Cl. 128—92 YY 4 Claims

1. A thin, elongated flexible and resilient bone nail, having a longitudinal axis and having a substantially uniform cross-section along the length thereof, for the treatment of fractures in the proximal femur zone, comprising a distal end portion adapted to be disposed at the outer surface of the femoral condyle and having a free end terminating in a distal tip of the nail, a proximal end portion adapted to be seated in the natural femoral head and having a free end, and a curved intermediate portion between said end portions, with said proximal end portion being provided at the free end thereof with a rounded-off thickened portion and with the cross-sectional configuration of said distal end portion of the nail being polygonal with edges rounded off and identical to the cross-sectional configuration of the remainder of the nail, except for said rounded-off thickened portion and a recess in said distal end portion formed by a solid polygonal cutout having a bottom surface substantially parallel to said longitudinal axis and a plurality of additional surfaces coincident with a partial perimeter of said polygonal cross-section, said recess forming a reduced gripping portion which is polygonal in cross section for engagement with a driving tool and said recess being spaced from the distal tip of the nail by a length.

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4,712,542

## SYSTEM FOR ESTABLISHING LIGAMENT GRAFT ORIENTATION AND ISOMETRY

Dale M. Daniel, Lamesa, and Kay R. Watkins, San Diego, both of Calif., assignors to Medmetric Corporation, San Diego, Calif.

Filed Jun. 30, 1986, Ser. No. 880,055

Int. Cl.[4] A61F 5/04

U.S. Cl. 128—92 V 15 Claims

1. A method for establishing skeletal referenced isometric positioning and tensioning of a ligament graft between fixation sites on a pair of articulated bones, said method comprising the steps of:

establishing the locations of said fixation sites;

drilling openings in said bones between said fixation sites;

skeletally fixing a first portion of an instrument adjacent one of said fixation sites;

disposing a tension element through said openings, temporarily fixing one end of said element at the other of said fixation sites, and temporarily fixing the other end of said element to a second portion of said instrument which is movable relative to said first portion for displacement of said element.

determining the amount of the movement of said second portion relative to said first portion, and the amount of said bias to establish the amount of said displacement and tension during flexion of said bones and, if necessary,

reestablishing said fixation sites and openings until said amount of said displacement and said tension satisfy predetermined criteria;

drilling larger graft openings in said bones between the established fixation sites;

repeating the foregoing skeletally fixing, disposing and determining steps relative to said graft; and

fixing said graft to the established fixation sites.

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4,712,543

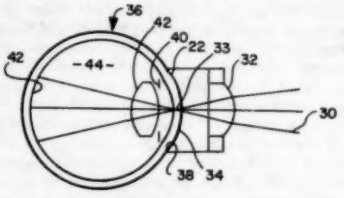
## PROCESS FOR RECURVING THE CORNEA OF AN EYE

Neville A. Baron, Medical Plz. #66, Rte. 46, Dover, N.J. 07801

Continuation-in-part of Ser. No. 340,978, Jan. 20, 1982, Pat. No. 4,461,294. This application Jul. 23, 1984, Ser. No. 633,197

Int. Cl.[4] A61B 17/36

U.S. Cl. 128—303.1 5 Claims




1. A process for predictably recurving the cornea of an eye which comprises disposing light-absorbing color bodies in said cornea and thereafter vaporizing at least some of said color bodies by applying thereto light energy focused thereon and defocused within said eye behind said cornea, said vaporization being effected according to a preselected patterned design and generating thereby corneal recurving scar tissue in said cornea according to said preselected patterned design.

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4,712,544

## ELECTROSURGICAL GENERATOR

Frieder H. Ensslin, Rochester, N.Y., assignor to Castle Company, Rochester, N.Y.

Filed Feb. 12, 1986, Ser. No. 828,472

Int. Cl.[4] A61B 17/39

U.S. Cl. 128—303.14 7 Claims

1. An electrosurgical generator for use with a living being comprising:

at least one electrical power generating means;

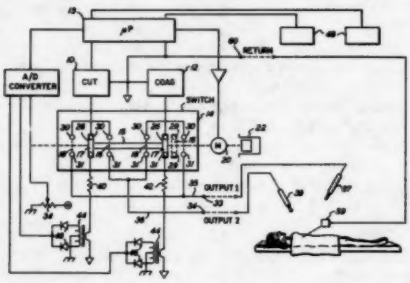
a first output port;

a first output circuit connected to said first output port for connecting the output of said at least one electrical power generating means to said first output port;

a measuring circuit having a known constant load, said measuring circuit being isolated from said first output circuit;

switch means for selectively connecting the output of said at least one power generating means to said measuring circuit or said first output circuit;

means for determining real power output of said at least one power generating means when said at least one power generating means is connected to said measuring circuit, said measuring circuit comprising a transformer placed in series with said known constant load for measuring the output current of said at least one power generating means, a full wave rectifier connected to the output of the secondary side of said transformer, an A/D converter connected to said rectifier, a microprocessor connected to said A/D converter for receiving a signal from said A/D converter and for displaying true power output, said at




least one electrical power generating means comprises two electrical power generating means, said electrosurgical generator comprising a second output port, a second output circuit connected to said second output port for connecting said first or second electrical power generating means to said second output port, said switch means being capable of allowing said first or second power generating means to be alternately selectively electrically connected to said first or second output circuit, said switch means having a first set and second set of corresponding input and output contacts associated with each of said power generating means so as to provide a first and second axially spaced switch positions associated with each of said first and second electrical power generating means, a movable switch member for moving between said first and second switch positions associated with each of said electrical power generating means at the same time, said movable member having means for providing electrical continuity between said one set of input and output contacts associated with each power generating means with said first or second output circuit.

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**4,712,545**

**SURGICAL INSTRUMENT**

**George P. Honkanen, Scituate, Mass., assignor to Acufex Microsurgical, Inc., Norwood, Mass.**

**Continuation of Ser. No. 596,923, Apr. 5, 1984, abandoned. This application Sep. 5, 1986, Ser. No. 904,949**

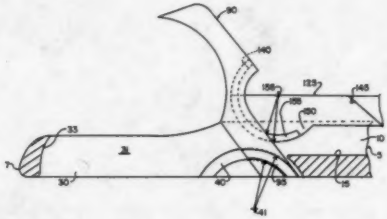
**Int. Cl.[4] A61B** *17/28, 17/32*

**U.S. Cl. 128—305** **43 Claims**

1. A surgical punch comprising a first stationary jaw member, a second movable jaw member, and a coupling member that is movable relative to said first stationary jaw member,

one of said jaw members comprising at least one first arcuate flange and the other of said jaw members comprising at least one first arcuate groove, said at least one first arcuate flange being slidably disposed in said at least one first arcuate groove so as to pivotally couple said second movable jaw member to said first stationary jaw member, whereby said second movable jaw member is capable of pivotal movement towards and away from said first stationary jaw member, with said at least one first arcuate flange and said at least one first arcuate groove having a first center of curvature that is fixed in position relative to said first stationary jaw member when said at least one first arcuate flange is disposed in said at least one first arcuate groove, and

one of said second movable jaw member and said coupling member comprising at least one second arcuate flange and the other of said second mobable jaw member and said coupling member comprising at least one second arcuate groove, said at least one second arcuate flange being slidably disposed in said at least one second arcuate groove so as to pivotally couple said coupling member to said second movable jaw member, with said at least one



second arcuate flange and said at least one second arcuate groove having a second center of curvature that is fixed in position relative to said coupling member and is not fixed in position relative to said first stationary jaw member when said at least one second arcuate flange is disposed in said at least one second arcuate groove, and one of said centers of curvature is displaced laterally from said stationary jaw member and said coupling member,

whereby (a) when said coupling member is moved in a first direction relative to said first stationary jaw member, said second movable jaw member will open away from said first stationary jaw member, and (b) when said coupling member is moved in a second opposite direction relative to said first stationary jaw member, said second movable jaw member will close towards said first stationary jaw member, said first and second jaw members being arranged so that body tissue located between said first and second jaw members may be severed in a punching motion as said jaw members are opened and closed relative to one another by movement of said coupling member relative to said first stationary jaw member.

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**4,712,546**

**CUTTING INSTRUMENT FOR NASAL SURGERY WHICH CUTS PARALLEL TO ITS LENGTH**

**Joel M. Noe, 59 Baxter Rd., Brookline, Mass. 02146**

**Filed Mar. 11, 1982, Ser. No. 357,265**

**Int. Cl.[4] A61F** *17/32*

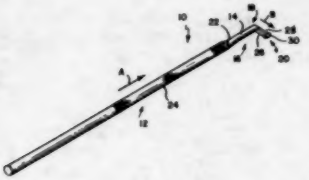
**U.S. Cl. 128—305** **5 Claims**

1. A cutting instrument for human nasal surgery consisting of:

an elongated portion extending along a first direction and having a first end means which is to be placed into a nostril during nasal surgery:

a single cutting extension extending from one side of said elongated portion in a second direction from said elongated portion at approximately ninety degrees from said first direction which has first and second cutting edges which point in opposite directions parallel to said first

direction and which extend in said second direction and which extension has a blunted non cutting end which



extends beyond said cutting edges away from said elongated portion in said second direction.

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**4,712,547**

## INSTRUMENT FOR SLITTING STENOSES IN BODILY PASSAGES

**Ludwig Bonnet, Jahnstrasse 28, 7134 Knittlingen, Fed. Rep. of Germany**

**Continuation of Ser. No. 862,690, May 13, 1986, abandoned. This application Jun. 25, 1987, Ser. No. 67,431**

**Claims priority, application Fed. Rep. of Germany, Jun. 7, 1985, 3520524**

**Int. Cl.[4] A61B *17/32***

**U.S. Cl. 128—311** **17 Claims**

9. A ureterotome for slitting stenoses in a ureter, comprising:

an elongated flexible shaft having first and second opposite ends and a passage extending along the longitudinal extent of said shaft, said first end having a slot laterally of said passage and defining an endmost portion of said ureterotome;

a blade pivotally mounted at said first end of said shaft in said slot for movement between a first position extending axially beyond said endmost portion of said ureterotome and a second position angularly related to said first position and extending laterally to one side of said shaft,

a first cutting edge of said blade being directed out said first end of said ureterotome when said blade is in said first position to slit a stenoses open wide enough to admit said ureterotome when said shaft is moved axially against the stenoses,

a second cutting edge of said blade being sheathed in said slot when said blade is in said first position and extending from said slot laterally of said shaft when said blade is in said second position; and

means at said second end of said shaft for selectively moving said blade between said first position and said second position.

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**4,712,548**

## BLOOD LANCING DEVICE

**Hans Enstrom, Graners Grand 1, S-151 57 Sodertalje, Sweden**

**Continuation-in-part of Ser. No. 541,989, Oct. 14, 1983, Pat. No. 4,676,244, which is a continuation-in-part of Ser. No. 245,080, Mar. 18, 1981, abandoned. This application Dec. 19, 1985, Ser. No. 810,924**

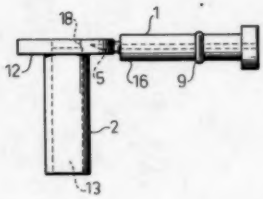
**Claims priority, application Sweden, Apr. 23, 1980, 80 03057**

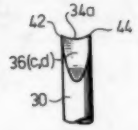
**The portion of the term of this patent subsequent to Jun. 30, 2004, has been disclaimed.**

**Int. Cl.[4] A61B *17/32***

**U.S. Cl. 128—314** **19 Claims**

1. A disposable miniature lancing device for obtaining a drop of blood by cutting the skin without passing through the body of the patient comprising a cylinder and a plunger, at least said cylinder being formed of a material distendable under force applied thereto, said plunger being insertable at its front end into said cylinder, said plunger and said cylinder having a slight clearance enabling said plunger to be freely slidable within said cylinder, sadi plunger having a radially extending flange at its rear end engageable with the rear end of said cylinder for limiting passage of said plunger throguh said cylinder and defining the full insertion of said plunger in said cylinder, a lancet integrally formed with said plunger and





having a cutting edge projecting axially from said front end of said plunger, said plunger, cylinder and lancet being so formed that said lancet protrudes from the front end of said cylinder a predetermined distance when said plunger is fully inserted within said cylinder, said cutting edge extending transversely to said plunger in a longitudinal plane passing through the central axis of said lancet and having a pair of identical inclined surfaces extending on either side of said longitudinal plane freom said cutting edge and forming uniform angles with the central plane.

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**4,712,549**

## AUTOMATIC HEMOSTATIC CLIP APPLIER

**Rudolph Peters; Ronald Peters, and William Taylor, all of Oakland, Calif., assignors to Edward Weck & Co., Research Triangle Park, N.C.**

**Filed Jul. 1, 1985, Ser. No. 750,158**

**Int. Cl.[4] A61B *17/12***

**U.S. Cl. 128—325** **24 Claims**

1. A tool for storing, dispensing, and applying a plurality of hemostatic clips in serial fashion, comprising;

magazine means for storing a plurality of hemostatic clips in column fashion;

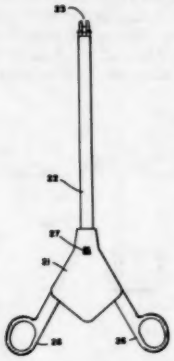
dispensing means for selectively removing and dispensing a hemostatic clip from one end of said column in serial, sequential fashion;

jaw means for retaining and crimping a hemostatic clip;

feed means for transferring a dispensed clip from said column to said jaw means,

actuating means for operating said feed means, jaw means, and dispensing means in sequential interaction, including a flexible band coupled to said feed means, a pulley member about which said flexible band is passed, lever means for pulling said flexible band around said pulley member in such a direction to withdraw said feed means from said jaw means, a jaw housing extending from said actuating means and adapted for reciprocal translation to close and open said jaw means, means for joining said pulley member to one end of said jaw housing in force translating

fashion, so that tension on said flexible band urges said jaw housing to extend from said tool, wherein said feed means includes a feeder slide assembly extending longitudinally from said tool in translatable fashion, and further includ-



ing first spring means extending between said proximal end of said feeder slide assembly and said proximal end of said jaw housing and adapted to be compressed elastically therebetween.

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**4,712,550**

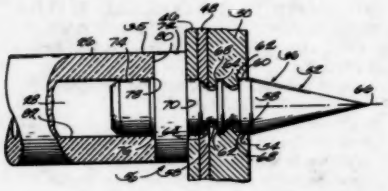
## RETINAL TACK

**Kevin B. Sinnett, W273S8555 Hillview Dr., Mukwonago, Wis. 53186**

**Continuation of Ser. No. 720,988, Apr. 8, 1985, abandoned. This application Dec. 5, 1986, Ser. No. 4,798**

**Int. Cl.[4] A61B *17/04*; F16B *15/08***

**U.S. Cl. 128—334 R** **15 Claims**



1. A retinal tack for securing a human patient's detached retina to the choroid comprising

a pointed forward end portion for piercing through the patient's retina, choroid, and sclera;

an elongated retaining portion extending rearwardly from said forward end portion and having a longitudinal dimension approximating the thickness of the patient's retina, choroid, and sclera, said retaining portion including one or more circumferentially-extending grooves for receiving sclera tissue displaced by said forward end portion during insertion therethrough; and

an enlarged head extending rearwardly from said retaining portion and having a radially outwardly extending flange portion for engaging the retina in the area surrounding the opening formed by said forward end portion.

**4,712,551**

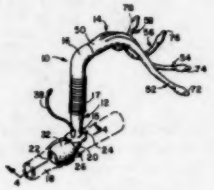
## VASCULAR SHUNT

**Simon B. Rayhanabad, P.O. Box 2200, Long Beach, Calif. 90801-2200**

**Filed Oct. 14, 1986, Ser. No. 918,148**

**Int. Cl.[4] A61B *17/04*; A61M *5/00, 21/00***

**U.S. Cl. 128—334 R** **18 Claims**



1. A vascular shunt comprised of a single, flexible tubular inlet end, an inlet tip projecting therefrom and turned to form a mouth and adapted for insertion into an incision surgically formed into the wall of an aorta so that said mouth is directed upstream in said aorta, releasable inlet sealing means connected to said inlet tip to block blood flow in said aorta beyond said inlet tip, a plurality of tubular branches in flow communication with said tubular inlet end each terminating in a discharge tip of internal cross section reduced from the internal cross section of said inlet tip, and separate releasable discharge sealing means connected to each of said discharge tips, whereby said discharge tips are each insertable into selected arteries and said discharge sealing means limits internal bleeding at the interfaces between said discharge tips and said arteries.

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**4,712,552**

## CUSHIONED ABRASIVE COMPOSITE

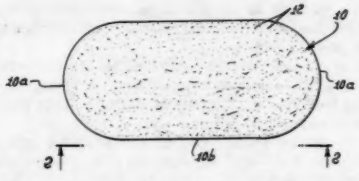
**William E. Pangburn, Ventura, Calif., assignor to William W. Haefliger, Pasadena, Calif., a part interest**

**Continuation of Ser. No. 580,190, Feb. 15, 1984, abandoned, which is a continuation-in-part of Ser. No. 356,830, Mar. 10, 1982, Pat. No. 4,459,987. This application Jun. 23, 1986, Ser. No. 831,808**

**The portion of the term of this patent subsequent to Jul. 17, 2001, has been disclaimed.**

**Int. Cl.[4] A61B *17/00*; B24B *3/46***

**U.S. Cl. 128—355** **10 Claims**



1. A composite cosmetic device, comprising

(a) a tough, flexible first sheet of silicone polymer, and having first and second sides,

(b) abrasive particulate consisting of pumice carried by and protruding from the first side of the sheet and exposed for rubbing contact with human skin or other work, said sheet being stretchable, and being formed from a layer of initially incompletely cured silicone polymer with which said particulate has been combined to adhere to the sheet, the sheet then allowed to cure, and

(c) other sheet means attached to said silicone polymer sheet and projecting from said second side thereof,

(d) said particulate penetrating, and anchored by, the silicone polymer of the first sheet at said first side of the sheet,

(e) said other sheet means including a release liner bonded to

said first sheet, and auxiliary sheet structure carrying said release liner.

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## 4,712,553

## SUTURES HAVING A POROUS SURFACE

David C. MacGregor, Miami, Fla., assignor to Cordis Corporation, Miami, Fla.

Filed May 30, 1985, Ser. No. 739,545
Int. Cl.[4] A61F 2/00; A61L 17/00
U.S. Cl. 128—335.5 13 Claims

1. A non-braided surgical suture, comprising:
a suture material including:
a flexible, non-metallic elongated central core member having an outside diameter that is less than that of the non-braided surgical suture;
a generally cylindrical porous elongated flexible, non-metallic portion that has an inside diameter which is substantially the same as said central core member outside diameter and that has an outside diameter that is no larger than that of a surgical suture, said generally cylindrical porous elongated flexible portion closely overlying said elongated central core member, and said generally cylindrical porous elongated flexible portion having a porous surface that promotes tissue ingrowth into said porous elongated flexible portion; and
said generally cylindrical elongated flexible portion includes a spun filament that is wound onto the elongated central core member into multiple layers that cross each other in order to form said porous surface.

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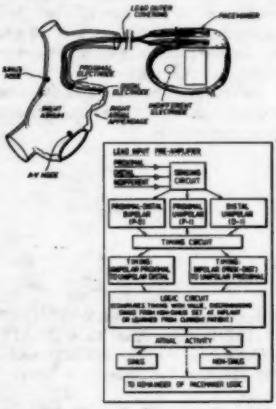
## 4,712,554

## ELECTRONIC SYSTEM TO DISTINGUISH BETWEEN SINUS AND NONSINUS ATRIAL DEPOLARIZATIONS WHICH DO NOT STIMULATE VENTRICULAR DEPOLARIZATIONS IN RESPONSE TO NONSINUS ATRIAL DEPOLARIZATIONS

Arthur Garson, Jr., Houston, Tex., assignor to Baylor College of Medicine, Houston, Tex.

Filed Apr. 8, 1985, Ser. No. 721,247
Int. Cl.[4] A61N 1/36
U.S. Cl. 128—419 PG 17 Claims

1. An electronic system for pacing a heart that distinguishes between sinus and nonsinus atrial depolarizations and that does not stimulate ventricular depolarizations in response to nonsinus atrial depolarizations, comprising:
an electric lead having first and second ends;
at least two electrodes;
means attaching one electrode to a first end of the lead and means attaching the other electrode to the lead for location in the right atrium when the first end is implanted in the right atrial appendage;
a sensing circuit including an indifferent electrode connected to the second end of the electric lead, said sensing circuit for detecting voltage difference between one of the electrodes and the indifferent electrode and for detecting voltage difference between the two electrodes;
a timing circuit connected to the sensing circuit said timing circuit for determining the time interval between the time a voltage difference is detected between one electrode and an indifferent electrode and the time a voltage difference is detected between the two electrodes;
a logic circuit connected to the timing circuit said logic circuit for comparing the time intervals determined by the timing circuit to time intervals indicative of sinus atrial depolarizations; and
a ventricular stimulating circuit connected to the logic circuit said ventricular stimulating circuit that does not stimulate ventricular depolarization when the comparison made by the logic circuit indicates that the immediately preceding atrial depolarization was nonsinus said ventricular stimulating circuit effective to stimulate ventricular depolarization only when an immediately preceding atrial contracting is a spontaneous or pacemaker stimulated sinus atrial depolarization.



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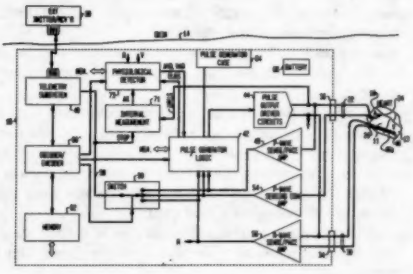
## 4,712,555

## PHYSIOLOGICALLY RESPONSIVE PACEMAKER AND METHOD OF ADJUSTING THE PACING INTERVAL THEREOF

Hans T. Thornander, Paris, France; John W. Poore, Chatsworth, Calif.; Jason A. Sholder, Canoga Park, Calif.; James R. Thacker, Saugus, Calif., and David C. Amundson, Pacific Palisades, Calif., assignors to Siemens-Elema AB, Solna, Sweden

Continuation-in-part of Ser. No. 662,723, Oct. 19, 1984. This application Mar. 27, 1985, Ser. No. 716,831
Int. Cl.[4] A61N 1/36
U.S. Cl. 128—419 PG 47 Claims



1. A cardiac pacemaker for controlling the rate at which a heart beats as a function of physiological need, said heart beat rate defining a cardiac cycle during which atrial and ventricular events occur, said pacemaker comprising:

means for generating an atrial stimulation pulse (A);
means for delivering said atrial stimulation pulse to an atrium of the heart in order to trigger atrial depolarization (P);
means for sensing the occurrence of said triggered atrial depolarization;
means for measuring the time interval between the generation of said atrial stimulation pulse and said triggered atrial depolarization, said atrial depolarization time interval being referred to as an A-P interval, said A-P interval varying as a function of physiological need; and
means for adjusting the pacemaker-controlled rate as a function of the measured A-P interval;
whereby the pacemaker-controlled rate is adjusted as a function of physiological need as sensed by measuring said depolarization time interval.

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**4,712,556**

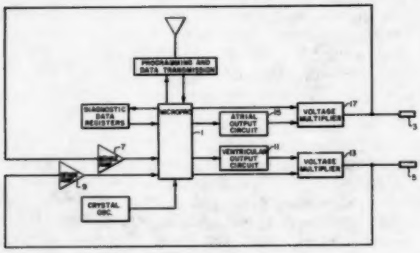
## PACEMAKER AND METHOD FOR VENTRICULAR RATE LIMIT OPERATION AND TERMINATION OF PACEMAKER MEDIATED TACHYCARDIA

**Ross G. Baker, Jr., Houston, Tex., assignor to Intermedics, Inc., Angleton, Tex.**

**Continuation of Ser. No. 443,559, Nov. 22, 1982, abandoned. This application Sep. 25, 1985, Ser. No. 780,702**

**Int. Cl.[4] A61N *1/36***

**U.S. Cl. 128—419 PG** **38 Claims**




1. A heart pacemaker, comprising:
means for sensing electrical events that occur in the atrium of a heart;
means for sensing electrical events that occur in the ventricle of the heart;
means for selecting an atrial refractory period;
means for timing said atrial refractory period from detected electrical events of the ventricle;
means for pacing the ventricle of the heart in synchronism with atrial events detected outside said atrial refractory period;
means for selecting a value of a ventricular rate limit that defines the maximum rate at which the ventricle can be paced;
said means for pacing the ventricle including means for pacing the ventricle at a rate that does not exceed said value of the ventricular rate limit;
means for counting a preselected number of successive atrial synchronous paces of the ventricle at the ventricular rate limit; and
means for preventing a pace of the ventricle in response to an atrial event sensed outside said atrial refractory period and after said preselected number of successive atrial synchronous paces of the ventricle is counted.

**4,712,557**

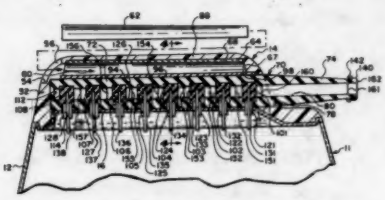
## A PACER INCLUDING A MULTIPLE CONNECTOR ASSEMBLY WITH REMOVABLE WEDGE AND METHOD OF USE

**Donald L. Harris, Miami, Fla., assignor to Cordis Leads, Inc., Miami, Fla.**

**Filed Apr. 28, 1986, Ser. No. 856,484**

**Int. Cl.[4] A61N *1/36***

**U.S. Cl. 128—419 P** **24 Claims**



1. A pacer including a connector assembly for use in a cardiac pacing system comprising:
a pacer case having a top wall and pulse generating means enclosed therein:
a pacing lead having a distal end, a distal end portion, a proximal end and a proximal end portion with a plurality of spaced apart connector bands mounted on said proximal end portion;
a neck assembly mounted to said top wall of said pacer case;
said connector assembly comprising an elastomeric neck mounted on said top wall of said pacer case and forming part of said neck assembly;
said neck having a lumen therein for receiving said proximal end portion of said pacing lead;
a plurality of resilient conductive means in said neck, each of said resilient conductive means being in registry with respective ones of said connector bands on said proximal end portion of said lead when said lead is positioned in said lumen;
and said neck assembly including removable means for urging said resilient conductive means against said connector bands thereby providing electrical continuity between said pulse generating means and said pacing lead.

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**4,712,558**

## ELECTRICAL STIMULATION OF MUSCLE

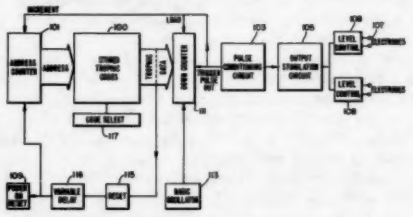
**Geoffrey Kidd, Liverpool, England; Daniel V. Maher, Ennis, Ireland, and Jozef Cywinski, Bronx, N.Y., assignors to Bio Medical Research Ltd., Ireland**

**Filed Mar. 12, 1985, Ser. No. 710,839**

**Claims priority, application United Kingdom, Mar. 13, 1984, 8406509**

**Int. Cl.[4] A61N *1/36***

**U.S. Cl. 128—421** **37 Claims**



1. Apparatus for the stimulation of muscle fibre by the application of a stimulating electrical signal to the muscle fibre or to overlying tissue, comprising control means, pulse generating means for generating an electrical signal for use as said stimu-

lating electrical signals and whose waveform carries information which affects the response of said muscle fibre to its stimulation by said signal and at least one pair of electrodes to be placed, in use, in electrical contact with the muscle fibre or overlying tissue, the pulse generating means being responsive in use to the control means to generate as said stimulating electrical signal a sequence of electrical pulses whose characteristics code for electrotrophic information thereby to convey electrotrophic information to the muscle fibre to bring about an electrotrophic response in said muscle fibre for effecting change in the muscle fibre to cause desired structural and/or functional adaptation of the muscle, and to supply the sequence of electrical pulses so generated to the said at least one pair of electrodes, which electrodes transmit the sequence of electrical pulses supplied by the pulse generating means to the muscle fibre or overlying tissue to impart thereto the electrotrophic stimulation to effect the desired structural and/or functional adaptation of the muscle.

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## 4,712,559

## LOCAL CURRENT CAPACITIVE FIELD APPLICATOR FOR INTERSTITIAL ARRAY

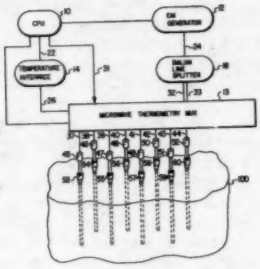
**Paul F. Turner, North Salt Lake, Utah, assignor to BSD Medical Corporation, Salt Lake City, Utah**

**Continuation-in-part of Ser. No. 750,408, Jun. 28, 1985. This application Sep. 20, 1985, Ser. No. 778,325**

**The portion of the term of this patent subsequent to Jun. 2, 2004, has been disclaimed.**

**Int. Cl.[4] A61N** *5/02*

**U.S. Cl. 128—422** **6 Claims**



1. An electromagnetic hyperthermia system for heating local regions of body tissue, said system comprising:

a source of electromagnetic energy;

a power divider connected to the source for distributing the electromagnetic energy, a plurality of power control means including at least an A channel and a B channel connected to the power divider for receiving the electromagnetic energy and controlling the electromagnetic energy conduction, a corresponding number of plurality of capacitive type applicators connected to the plurality of power control means, a plurality of tube means for insertion into the body tissue in or around a cancerous growth, each of said plurality of tube means adapted to receive an applicator of the corresponding number of plurality of capacitive type applicators, said plurality of capacitive type applicators being mounted in the plurality of tube means for acting as electrodes of which at least one electrode is connected to channel A and at least one electrode is connected to channel B for enabling current to flow between channel A and channel B through the tissue to be heated and said plurality of capacitive type applicators further including temperature sensing means for providing an indication of adjacent body tissue temperatures; and

a data processing means connected to the source, the plurality of power control means and the temperature sensing means for controlling the amount of heating in accordance with a desired heating pattern.

## 4,712,560

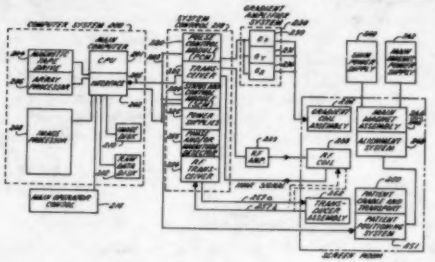
## APPARATUS AND METHOD OF ACQUIRING PHYSIOLOGICAL GATING SIGNALS FOR MAGNETIC RESONANCE IMAGING OF MOVING OBJECTS

**Daniel J. Schaefer, Waukesha, and Kenneth W. Belt, Fort Atkinson, both of Wis., assignors to General Electric Company, Milwaukee, Wis.**

**Filed Aug. 9, 1985, Ser. No. 764,092**

**Int. Cl.[4] A61B** *5/05*

**U.S. Cl. 128—653** **23 Claims**



11. In an MRI system having a main magnet with a central bore and a RF coil for generating RF signals which excite nuclei in an image region of a subject positioned in the bore of said main magnet so as to generate MR data for acquisition by said system, a method of providing data indicative of the physiological motion of the subject, said method comprising the steps of:

exciting said RF coil with an RF source at a first frequency different from a second frequency used to acquire MR data;

sensing a portion of said first frequency which is reflected by said coil back to said RF source;

comparing the characteristics of the reflected signals with those of the generated signals to produce a trigger signal indicative of relative changes in the characteristics of the generated and reflected signals such that the magnitude of said trigger signal is approximately linearly related to the extent of physiological motion in the imaging region and the slope of said trigger signal is approximately linearly related to the direction and speed of the physiological motion in the imaging region; and

triggering acquisition of MR data in response to said trigger signal so as to generate an MR image which is not blurred by the physiological motion of said imaging region.

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## 4,712,561

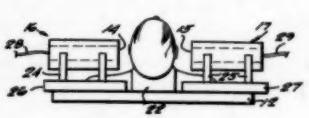
## NEURORECEPTOR ACTIVITY ASSESSMENT

**Henry N. Wagner, Jr., Baltimore, Md., assignor to Johns Hopkins University, Baltimore, Md.**

**Filed Mar. 25, 1985, Ser. No. 715,371**

**Int. Cl.[4] A61B** *6/00*

**U.S. Cl. 128—654** **14 Claims**



1. A method of optimizing the effect on a living patient of drugs and substances that affect brain chemistry, comprising the steps of:

(a) administering to the patient a tracer substance comprising a ligand that binds to presynaptic or postsynaptic neuroreceptors;

(b) waiting a period of time sufficient for the ligand to bind to the neuroreceptors;
(c) measuring emissions from the tracer substance which are indicative of the number of the patient's neuroreceptors and the degree of occupancy or blocking of the patient's neuroreceptors;
(d) calculating the number of neuroreceptors and the degree of occupancy or blocking of the neuroreceptors by another, treatment, drug or substance utilizing a mathematical model computation;
(e) comparing the calculations obtained in step (d) with an intra-person control, if one is available for the patient, or if an intra-person control for the patient is not available, comparing the calculations with an inter-person control, to determine the degree of drug response; and
(f) gauging further treatment of the patient with the treatment drug or substance based upon the comparison made in step (e).

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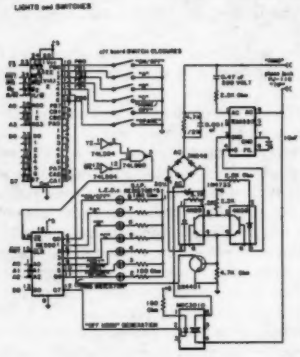
**4,712,562**

## OUTPATIENT MONITORING SYSTEMS

**Jacques J. Ohayon, 316 Oakville Dr., Pittsburgh, Pa. 15220, and Glen P. Williams, Pittsburgh, Pa., assignors to Jacques J. Ohayon, Pittsburgh, Pa.**

**Continuation of Ser. No. 689,655, Jan. 8, 1985, abandoned. This application Oct. 1, 1986, Ser. No. 914,088**
**Int. Cl.[4] A61B 5/02**
**U.S. Cl. 128—672** **3 Claims**



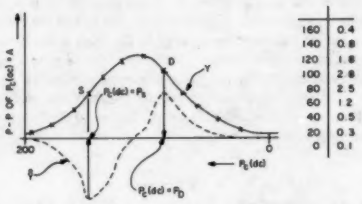
1. A system for providing information pertaining to a blood pressure of a patient utilizing telephone lines, including a ring line and a tip line, said system comprising:
means for generating signals representing the level of blood pressure of a patient and signals representing the identity of to which patient, of at least two patients, the blood pressure signals pertain, said signals being suitable for transmission over said telephone lines;
a remote central digital processor; and
means for transmitting said blood pressure signals and said patient identifying signals over said telephone lines to said remote central digital processor, and including an off hook detecting circuit having voltage measuring means for measuring voltage across said ring and tip lines, and switching means responsive to the measured voltage and operative to connect said transmitting means to the telephone lines only when said voltage is above a predetermined voltage indicating that the telephone lines are not in use,
said central processor including storage means which stores said blood pressure signals in a form suitable for latter access, and analyzing means which analyzes said blood pressure signals according to predetermined criteria.

**4,712,563**

## METHOD OF AND APPARATUS FOR DETERMINING THE DIASTOLIC AND SYSTOLIC BLOOD PRESSURE OF A PATIENT

**William T. Link, Berkeley, Calif., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.**

**Filed May 28, 1986, Ser. No. 868,400**
**Int. Cl.[4] A61B 5/02**
**U.S. Cl. 128—681** **4 Claims**




1. A method of determining the diastolic and systolic blood pressures of a particular patient, comprising the steps of:
(a) placing blood pressure cuff means adjacent a particular artery of said patient;
(b) using means cooperating with said cuff means, pressurizing said cuff means to a number of different cuff pressure levels from a level below the anticipated diastolic pressure of the patient to a pressure above the patient's anticipated systolic pressure and generating cuff pulses having peak to peak amplitude values corresponding to and dependent on said different cuff pressure levels; and
(c) electronically obtaining the diastolic and systolic pressures of said patient mathematically using said cuff pulses, said step of obtaining said diastolic and systolic pressures mathematically including the steps of:
(i) generating a curve corresponding to the peak to peak amplitude values of said cuff pulses as a function of said different cuff pressure levels,
(ii) differentiating said curve with respect to said different cuff pressure levels, said differentiated curve including a first peak point at a cuff pressure level equal to the diastolic pressure of said patient and a second peak point at a cuff pressure equal to the systolic pressure of said patient, and
(iii) from said differentiated curve, obtaining the patient's diastolic and systolic pressures by identifying said first and second peak points and determining the cuff pressures at those points.

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**4,712,564**

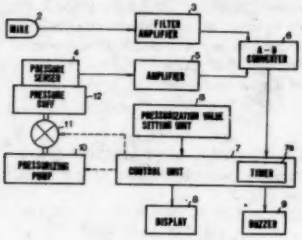
## BLOOD PRESSURE MEASURING APPARATUS

**Keiji Yamaguchi, Shimizu, Japan, assignor to Terumo Corporation, Tokyo, Japan**

**Filed Feb. 11, 1986, Ser. No. 828,189**
**Claims priority, application Japan, Feb. 13, 1985, 60-24460**
**Int. Cl.[4] A61B 5/02**
**U.S. Cl. 128—682** **16 Claims**

1. A blood pressure measuring apparatus in which a pressure cuff is adapted to be affixed to a patient, comprising:
pressurizing means for feeding a fluid into the pressure cuff to effect pressurization thereof;
sensing means for sensing blood flow sounds produced by a blood vessel of the patient when the pressure cuff, pressurized by said pressurizing means, is depressurized and for producing an output signal indicative of the blood flow sounds;
first measuring means for measuring elapsed time from when depressurization starts until said sensing means first generates the output signal indicative of the blood flow sound;
second measuring means for measuring a pulse interval

between blood flow sounds in dependence upon the output signal from said sensing means; and




decision means for deciding whether pressurization is inadequate on the basis of a relationship between the elapsed time measured by said first measuring means and the pulse interval measured by said second measuring means.

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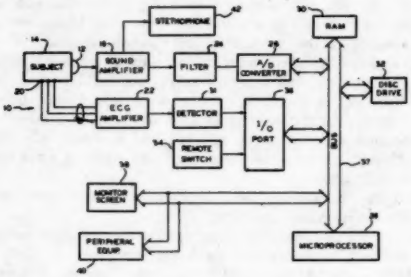
**4,712,565**

## METHOD AND APPARATUS FOR EVALUATING OF ARTIFICIAL HEART VALVES

**Hart V. Katz, Willowdale, Canada, and Gerald A. Kien, Tower Lakes, Ill., assignors to International Acoustics Incorporated, Palatine, Ill.**

**Filed Oct. 27, 1986, Ser. No. 923,576**
**Int. Cl.[4] A61B *5/02***
**U.S. Cl. 128—715** **16 Claims**




1. An apparatus for non-invasive evaluation of implanted artificial heart valves, comprising:

transducer means for converting heart sounds into electrical signals corresponding to a phonocardiogram;

amplifying means for amplifying the electrical signals and for generating amplified electrical signals;

means for filtering said amplified electrical signals and for generating filtered electrical signals;

means for converting said filtered electrical signals into a series of digital signals;

microprocessor means responsive to said series of digital signals for processing a portion of said series of digital signals corresponding to valve sounds in the phonocardiogram;

a deconvolution algorithm for transforming said portion of said series of digital signals into an impact history signal to characterize the occluding elements of the valve;

means for converting said impact history signal into a digital output signal; and

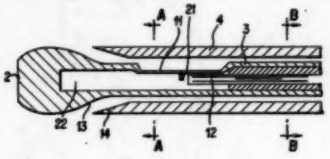
means for recording graphically said digital output signal.

**4,712,566**

## DEVICE FOR RECORDING PHYSIOLOGICAL PRESSURES

**Bertil Hök, Västerås, Sweden, assignor to Radisensor AB, Västerås, Sweden**

**PCT No. PCT/SE86/00005, § 371 Date Sep. 5, 1986, § 102(e) Date Sep. 5, 1986, PCT Pub. No. WO86/03956, PCT Pub. Date Jul. 17, 1986**
**PCT Filed Jan. 9, 1986, Ser. No. 915,066**
**Claims priority, application Sweden, Jan. 10, 1985, 8500104**
**Int. Cl.[4] A61B *5/00***
**U.S. Cl. 128—748** **20 Claims**




1. A device for recording physiological pressures, comprising an essentially threadlike guide (3) inserted into a catheter (4), and at least one sensor element (1) provided near the tip of the guide (3), said at least one sensor element (1) producing an electrical or optical signal representing the hydrostatic pressure prevailing at the sensor element,

characterized in that the guide (3) and the catheter (4) have at least one sealing surface (5, 6; 15, 16) each which are brought into contact with each other and which open and shut-off the hydraulic communication between the sensor element (1) and its surrounding medium by means of axial or rotary motion of the guide (3) in relation to the catheter (4), whereby the sensor element (1), via the interior of the catheter (4), can be brought into pressure communication with a pressure generator (7) connected to a proximal end of the catheter (4), said pressure generator being arranged to generate and transmit known calibration pressures to the sensor element (1).

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**4,712,567**

## LIQUID METER ASSEMBLY

**Henrick K. Gille, Van Nuys; Richard S. Willing, Granada Hills; William G. Bloom, Northridge; Bernard Siegel, Los Angeles; Tsang Cheung, La Canada; Richard Lobodzinski, Sunland, and Keith Gilroy, Valencia, all of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.**

**Filed Mar. 14, 1985, Ser. No. 712,953**
**Int. Cl.[4] A61M *1/00***
**U.S. Cl. 128—771** **32 Claims**

1. A liquid meter assembly comprising:

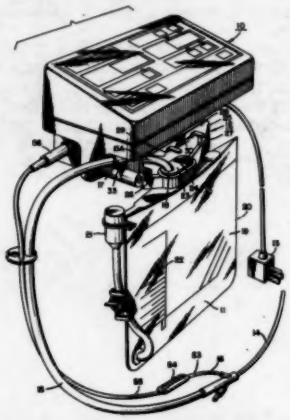
a container for collecting the liquid;

an electrical strain gauge suspension means for supporting the container and for determining the weight of liquid collected in the container;

a handle means on the container for interconnecting with the strain gauge suspension means;

a length of tubing attached to the container and adapted for interconnecting with the source of the liquid;

means to substantially inhibit influence on weight determination due to any movement of said tubing; and



a power supply means for providing power to the strain guage suspension means.

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**4,712,568**

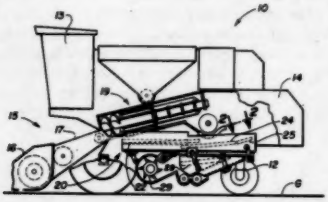
**COMBINE SIEVE ADJUSTMENT MECHANISM**

**Russell W. Strong, Brugge, Belgium, and Kenneth S. Rutt, Lancaster, Pa., assignors to New Holland Inc., New Holland, Pa.**

**Filed Mar. 10, 1986, Ser. No. 837,913**

**Int. Cl.[4] A01F *12/44***

**U.S. Cl. 130—272** **10 Claims**



1. In a combine having a mobile frame adapted for movement over a field to harvest crop material therefrom; crop gathering means supported from said frame to gather crop material, including both grain crop and trash material, from the field; threshing and separating means mounted on said frame to receive crop material from said crop gathering means and process said crop material to remove said grain crop from the trash material; and cleaning means supported on said frame proximate to said threshing and separating means to receive grain crop therefrom and further separate said grain crop from any residual trash material associated therewith, said cleaning means including an adjustable sieve having a plurality of transversely extending slats pivotally mounted in a sieve frame and an adjustment mechanism operatively connected to said slats to pivotally move said slats within said sieve frame, said slats defining openings through said sieve to permit the passage of said grain, the size of said openings being variable with the pivoted movement of said slats, an improved adjustment mechanism comprising:

a fore-and-aft extending slat connection member interconnecting said slats to effect a simultaneous pivotal movement thereof upon a fore-and-aft movement of said slot connection member;

an upwardly extending pivot member pivotally mounted on said sieve frame and connected to said slat connection member so that a pivotal movement of said pivot member causes a corresponding fore-and-aft movement of said slot connection member; and

a retractable handle connected to said pivot member and being movable into an actuation position in which said handle extends upwardly above said sieve and can be operable to effect pivotal movement of said pivot member, said handle also being movable to a retracted position to minimize the obstruction therefrom to the flow of crop material across said sieve.

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**4,712,569**

**PIPE STEM REPLACEMENT KIT**

**Alfred S. Baier, 91 Pleasant St., Apt. D-1; P.O. Box 113, Medfield, Mass. 02052**

**Filed Feb. 6, 1986, Ser. No. 826,678**

**Int. Cl.[4] A24F *9/00***

**U.S. Cl. 131—328** **3 Claims**

1. A pipe stem replacement kit for user repair of a pipe of the type having an air-flow channel therein leading to a pipe, comprising:

a replacement pipe stem having at one end a mouth piece and having at the other end a threaded aperture defined therein, said threaded aperture being continuous with the air flow of said pipe stem, said pipe stem being curved inwardly at the end having said threaded aperture;

a plurality of tenons having different diameters, each tenon having at one end a cylindrical portion and having at the other end a threaded portion with an aperture therethrough for the passing of said air flow, said threaded portion adapted to be inserted and screwed into said threaded aperture in the end of said stem opposite said mouthpiece;

sandpaper for sanding the cylindrical portions of said tenon for insertion into said pipe;

wax to act as a lubricant when applied to said tenon before insertion of said sanded tenon into said pipe;

whereby said kit is to be utilized by determining the diameter of the shank aperture in the pipe in which said replacement pipe stem is to be placed, selecting an appropriate tenon; sanding and testing the fit of the selected tenon by screwing said tenon into said pipe stem, and waxing said tenon for easy insertion of said tenon into said pipe stem aperture until said pipe stem is in place in said pipe.

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**4,712,570**

**COMBINATION BRUSH/ROLLER HAIR-GROOMING TOOL**

**Sebastian Caccioppo, 201 E. 28th St., New York, N.Y. 10016**

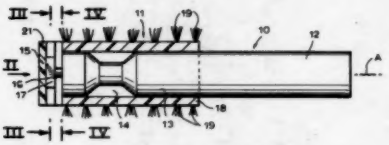
**Filed Mar. 11, 1986, Ser. No. 838,556**

**Int. Cl.[4] A45D *2/00***

**U.S. Cl. 132—40** **4 Claims**

1. A hair-grooming tool, comprising a wand extending along a wand axis and having a rear handle portion adapted to be held in the hand and an opposite front portion having a front wand end, said front wand end being provided with a projection extending transversely said wand axis; and a tubular roller aleeve extending along a sleeve axis and having an axially open first roller end and an opposite closed second roller end, said

roller sleeve being provided with radially outwardly projecting bristle tufts, said roller sleeve having at said second roller end two walls extending transversely to said sleeve axis and spaced from one another in an axial direction so as to define a space therebetween, one of said walls being solid while the other of said walls being provided with a transverse slot, and said roller sleeve being provided in said space between said walls with two webs spaced from one another in a circumferential direction, so that said wand can be removably attached to said roller sleeve by passing said projection of said wand in



an insertion direction through said slot of said other wall of said roller sleeve, and then turning said wand and thereby said projection of said wand to a position circumferentially offset from said slot so that said other wall of said roller sleeve than prevents unintentional axial withdrawal of said wand from said roller sleeve in a direction opposite to said insertion direction during operation, by abutting said projection of said wand against said other wall of said roller sleeve, while said webs of said wand prevent unintentional rotation of said wand relative to said roller sleeve during operation.

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**4,712,571**

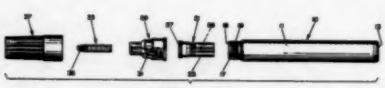
## NAIL POLISH COMPOSITIONS AND MEANS FOR APPLYING SAME

**Harvey M. Remz, Huntington; Philip J. Gordon, Southbury; John D. Cunningham, Madison, and Joseph D. Melnik, Stratford, all of Conn., assignors to Chesebrough-Pond's, Inc., Greenwich, Conn.**

**Continuation-in-part of Ser. No. 626,307, Jun. 29, 1984, abandoned. This application Jan. 8, 1985, Ser. No. 689,663**

**Int. Cl.[4] A45D *40/26*; A61K *7/04***

**U.S. Cl. 132—88.7** **27 Claims**



1. A low viscosity nail polish composition comprising from about 2.0% to about 40% primary film former selected from the group consisting of nitrocellulose, cellulose propionate, cellulose acetate butyrate, ethyl cellulose, sucrose acetate isobutyrate, polyvinyl acetate, polyvinyl alcohol, acrylic resins, urethane polymers, nylon, polyesters and alkyds; from about 3% to about 24% shade paste comprising 20%–80% pigment in mill base; and an amount of thinner sufficient to render the Brookfield viscosity of the final composition not greater than 200 cps.

25. An applicator means for dispensing the nail polish composition according to claim 1 containing said composition and comprising a pen having a substantially non-bristle nib.

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**4,712,572**

## DENTAL FLOSS PACKET AND METHOD FOR ITS MANUFACTURE

**William G. Hovel, III, P.O. Box 26766, El Paso, Tex. 79926**

**Filed Sep. 16, 1986, Ser. No. 907,991**

**Int. Cl.[4] A61C *7/00***

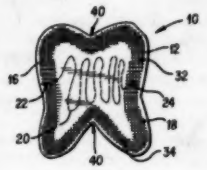
**U.S. Cl. 132—89** **6 Claims**

1. A dental floss packet comprising;

first and second overlying sheets of water resistant material defining a bi-lobal configuration representative of a molar, said overlying sheets having a left and right periphery,

said packet including a top periphery having elevated left and right peaks and an intermediate depression forming a top apex, a bottom periphery having depending left and right roots and an intermediate indentation forming a bottom apex,

a length of dental floss between said sheets having one end thereof secured to a portion of said left periphery and having another end thereof secured to a portion of said right periphery,



a die stamped seal extending entirely along said peripheries to secure said sheets together with said dental floss therebetween, and

an axis between said two apices substantially bisects said packet and defines a dimension representing the minimum distance between said top and bottom peripheries whereby,

a path of least resistance is presented by said apices as said left and right peripheries are grasped to tear apart said overlying sheets along the line between said apices.

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**4,712,573**

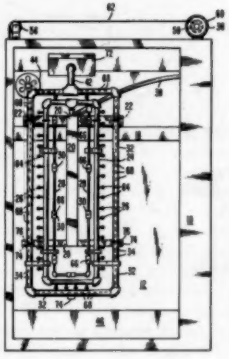
## APPARATUS FOR MOVABLY WASHING, RINSING AND DRYING A STATIONARY ARTICLE

**Henry Y. Kuhl, P.O. Box 26, Kuhl Rd., Flemington, N.J. 08822-0026**

**Filed May 16, 1986, Ser. No. 863,906**

**Int. Cl.[4] B08B *3/02***

**U.S. Cl. 134—95** **20 Claims**



1. An apparatus for movably washing, rinsing and drying a stationary article comprising:

(a) a housing means defining a washing chamber therein, said housing means including an open area to allow entry and exit of the article to be cleaned within said washing chamber;

(b) a support strut means fixedly secured with respect to said housing means and extending laterally and horizontally through said washing chamber;

(c) a carriage means movably mounted on said support strut

means to allow lateral movement thereof along said support strut means;

(d) a support wheel means rotatably mounted with respect to said carriage means and engageable with respect to said support strut means to movably mount said carriage means with respect thereto;

(e) a washing conduit fixedly secured with respect to said carriage means to be movable therewith, said washing conduit defining wash outlet means therein to selectively release cleaning solution therefrom;

(f) a rinsing conduit fixedly secured with respect to said carriage means to be movable therewith, said rinsing conduit defining rinse outlet means therein to selectively release rinsing solution therefrom;

(g) a drive means secured with respect to said carriage means for reciprocal movement thereof;

(h) a washing supply line in fluid flow communication with respect to said washing conduit to supply cleaning solution thereto;

(i) a rinsing supply line in fluid flow communication with respect to said rinsing conduit to supply rinsing solution thereto; and

(j) a bumper means fixedly secured with respect to said carriage means and extending rearwardly therefrom to selectively contact the rear area of said housing means and prevent excessive movement of said carriage means with respect to said support strut means as a result of reaction forces exerted by release of cleaning and rinsing solutions from the conduits secured to said carriage means.

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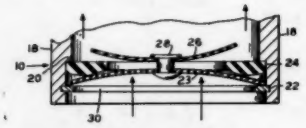
**4,712,574**

## VACUUM-BREAKING VALVE FOR PRESSURIZED FLUID LINES

**Charles H. Perrott, Portland, Oreg., assignor to C. H. Perrott, Inc., Portland, Oreg.**

**Filed Apr. 23, 1987, Ser. No. 41,401**
**Int. Cl.[4] F16K *24/04***
**U.S. Cl. 137—217** **5 Claims**




1. For use in a pressurized line delivering liquid to an outlet, a vacuum breaking valve for preventing backflow and siphoning comprising:

(a) a conduit adapted for tapping into the line upstream of the outlet,

(b) a housing having an open end connected to the conduit,

(c) the interior of the housing having an annular, outwardly facing shoulder,

(d) check valve means dimensioned for reception in the housing, seated against the shoulder, and

(e) retaining means position in the housing for releasably retaining the check valve means therein,

(f) the check valve means comprising,

(1) a perforated backup plate adapted for bearing engagement with the retaining means,

(2) a floating, centrally ported valve seat plate seated against the shoulder and bearing against the backup plate,

(3) a flexible, valve disc overlying the port in the valve seat plate in valving relation thereto, and

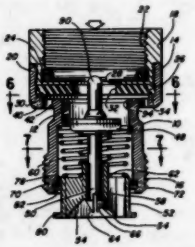
(4) centrally located interconnecting means interconnecting the backup plate and the valve disc, confining the valve seat plate in operative positions between them.

**4,712,575**

## SELF-DRAINING HOSE CONNECTION VACUUM BREAKER AND BACKFLOW PREVENTER

**John E. Lair; Lawrence F. Luckenbill, and Richard J. Holliday, all of Decatur, Ill., assignors to A. W. Cash Valve Manufacturing Corporation, Decatur, Ill.**

**Filed Mar. 2, 1987, Ser. No. 20,566**
**Int. Cl.[4] F16K *24/00***
**U.S. Cl. 137—218** **22 Claims**



10. A self-draining hose connection vacuum breaker and backflow preventer comprising, a body with an internal passage having inlet and outlet ends, backflow prevention means in said passage including a diaphragm and a movable member with said movable member having an active position engaging the diaphragm and an inactive position spaced from said diaphragm, and means responsive to the attachment of a hose to said body for yieldably urging said movable member from the inactive position to the active position.

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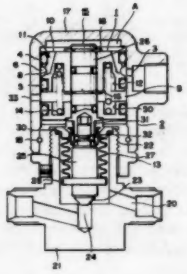
**4,712,576**

## PNEUMATICALLY OPERATED VALVE

**Ryozo Arilzumi, Ohmiya, and Takashi Ejiri, Tokyo, both of Japan, assignors to Fujikura Rubber Limited, Tokyo, Japan**

**Filed Jan. 31, 1986, Ser. No. 824,905**
**Claims priority, application Japan, Mar. 29, 1985, 60-63224; Mar. 29, 1985, 60-63225; Jul. 3, 1985, 60-100479[U]**
**Int. Cl.[4] F16K *31/122, 1/48***
**U.S. Cl. 437—270** **18 Claims**



1. In a pneumatically operated valve which includes a passage through which a fluid can flow, a casing having a piston chamber therein, a piston slidably supported in the piston chamber for reciprocal movement and having a piston rod thereon, the piston rod having a valve portion thereon and the piston being movable between first and second positions in which the valve portion of the piston rod respectively permits and obstructs fluid flow through the passage, means for exerting a force on the piston which yieldably urges it in a predetermined direction toward one of its first and second positions, and means responsive to a predetermined fluctuation of fluid pressure in the passage for effecting movement of the piston by

introducing pressurized air into the piston chamber in a manner causing it to act on the piston in a direction opposite the predetermined direction against said force exerted on the piston, the improvement comprising wherein the means for effecting movement of the piston includes an inlet port through which the pressurized air is introduced into the piston chamber in the casing being provided in a side wall of the casing in which the piston is accommodated slidably, wherein two sealing portions in airtight contact with an inner wall of the casing are provided on an outer surface of the piston in a spaced relationship so that an annular space is formed between them, and wherein the means for effecting movement of the piston includes a controlling passage provided through the piston, one end of said controlling passage opening into said annular space and the other end thereof opening through a surface of the piston which faces generally in said predetermined direction.

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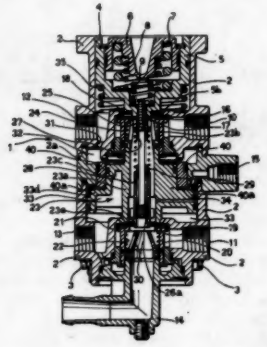
4,712,577

## PNEUMATIC VALVE FOR BRAKING SYSTEMS

Domenico Angelillo, Sesto San Giovanni, Italy, assignor to Industrie Magneti Marelli S.r.l., Milan, Italy

Filed Apr. 2, 1987, Ser. No. 33,383
Claims priority, application Italy, Apr. 2, 1986, 53220/86[U]
Int. Cl.[4] F16K *11/22, 31/143;* B60T *15/06*
U.S. Cl. 137—270 2 Claims



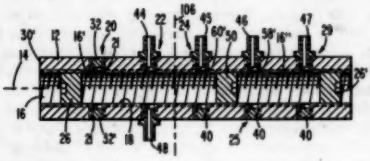
1. Pneumatic valve, particularly for braking systems, comprising a body with an inlet connector and an outlet connector for connection to a pressure source and a pneumatic circuit respectively, and with an obturator valve which controls communication between the connectors and a control device for the valve, including a piston sealingly slidable in a guide portion of the body between a first chamber which can be put into communication with a pressure source and a second chamber housing the valve, so that the piston can move and open the valve under the effect of the pressure in the first chamber characterised in that the guided portion of the piston is generally cylindrical and has a smaller cross-section than the passage cross-section of the guide portion of the body, and in that an intermediate member is sealingly interposed between the guided portion of the piston and the guide portion of the body, the intermediate member having stop means and being locatable between the wall of the body and the guided portion of the piston in first or second orientations, in which the stop means respectively allow and prevent its movement with the piston under the effect of the pressure in the chamber; the intermediate member being able to transfer to the piston the force exerted thereon by the pressure in the first chamber, in its first orientation.

4,712,578

## FLUID MANIFOLD SYSTEM

Allan E. White, Hightstown, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Apr. 18, 1986, Ser. No. 853,430
Int. Cl.[4] F17D *1/08*
U.S. Cl. 137—271 13 Claims



1. A fluid manifold comprising:

a body;

a threaded first conduit having threads of a first given thread size, said conduit and threads extending into the body a given length in communication with at least one exterior body surface;

a plurality of threaded second conduits of a second given thread size, each in an exterior body surface in communication with the first conduit and spaced along the threaded length of the first conduit;

a plurality of threaded first elements adapted to mate with the first conduit threads to block the flow of fluid through the first conduit; and

at least one threaded second fluid coupling element adapted to mate with a selected one of said first and second conduits to fluid couple the first conduit in communication therewith to a region external to the body;

said first elements being positioned and spaced in said first conduit to divide said first conduit into at least two separate chambers.

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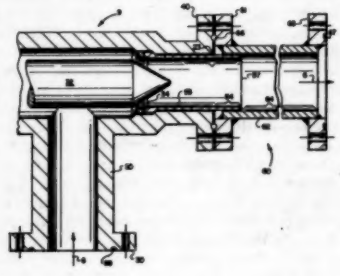
4,712,579

## WELL FLOW LINE CHOKE

Herbert A. Wolcott, and James H. McHaney, both of Plano, Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jul. 22, 1983, Ser. No. 516,067
Int. Cl.[4] F16K *25/04*
U.S. Cl. 137—375 1 Claim



1. In a well flow line choke having a body with a first aperture which extends longitudinally through said body from a first end of said body to a second fluid outlet end of said body, said body having a second aperture therein which has a fluid inlet at one side of said body and which extends through said body to intersect and communicate with said aperture intermediate the first and second ends of said first aperture, and hollow insert means carried concentrically and interiorally of said first

aperture between the point where said first and second apertures intersect and said fluid outlet end of said first aperture, the improvement comprising said insert means extending in a continuous unrestricted manner to said fluid outlet end of said first aperture and a substantial distance beyond said fluid outlet end and outside said body whereby any blast effect that may occur due to a pressure change inside said insert means in said body is transferred without flow restriction outside said body by said insert means before being released by said insert means, and a blast receiving means carried by said body adjacent said fluid outlet end and surrounding the portion of said insert means which extends outside said body whereby any blast effect released by said insert means is received by said blast receiving means, said blast receiving means further comprising a preferentially consumable, hollow, elongated member which is specifically designed to receive and absorb a blast effect and which fits concentrically about the portion of said insert means which extends outside said body, said member extending a finite distance away from the fluid outlet end of said first aperture, said member being removably carried by said body and said flow line for ease of inspection and replacement should excessive wear be experienced by said member due to any blast effect from fluid passing therethrough.

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**4,712,580**

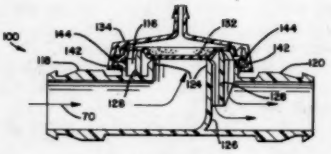
**EXHALATION VALVE ASSEMBLY**

**Keith Gilman, W. Cajon Valley, and Bruce W. Lutz, Hesperia, both of Calif., assignors to Intertech Resources Inc., Bannockburn, Ill.**

**Filed Mar. 21, 1986, Ser. No. 842,670**

**Int. Cl.[4] F16K *15/14***

**U.S. Cl. 137—512.15** **6 Claims**




1. A valve assembly for use in a volume ventilator, said valve assembly comprising a valve body having an exterior wall in part defining a pressure chamber, a gas inlet conduit in flow communication with the pressure chamber, said gas inlet conduit forming a discharge port in said pressure chamber, a gas outlet conduit in flow communication with said pressure chamber for directing gas out of said pressure chamber, said outlet conduit being located concentrically around said discharge port, diaphragm means removably disposed in and extending across said valve body, said discharge port, said outlet conduit and said pressure chamber being on one side of said diaphragm means, said diaphragm means including a central portion engageable with said discharge port for selectively closing off said discharge port, said diaphragm means defining the remainder of said pressure chamber and further including an annular arched portion which is spaced radially from said central portion, and a cover having a gas inlet joined to the valve body and extending across the diaphragm means on the opposite side thereof from the pressure chamber, said cover engaging and clamping the outer periphery of said arched portion, said arched portion being spaced in the direction of said opposite side from said central portion and said outer periphery,

a generally tubular ring structure joined to said valve body and located concentrically between said discharge port and said exterior wall and within the pressure chamber, said ring structure being separate from said exterior wall by a predetermined distance and extending into said pressure chamber such that the ring structure engages and supports said arched portion of the diaphragm means between the exterior wall and the discharge port and thereby decreases the effective area of the diaphragm means, said ring structure being spaced in the direction of said opposite side from said discharge port and said outer periphery and normally engaging said arched portion when said diaphragm means is in its relaxed position, flow passages being formed between said ring structure and said outer wall and between said ring structure and said discharge port.

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**4,712,581**

**DISTRIBUTION DEVICE FOR A TWO-PHASE FLOW**

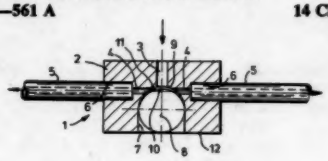
**Klaus-Dieter Emmenthal, Wolfsburg, and Joachim Neumann, Braunschweig, both of Fed. Rep. of Germany, assignors to Volkswagen Aktiengesellschaft, Wolfsburg, Fed. Rep. of Germany**

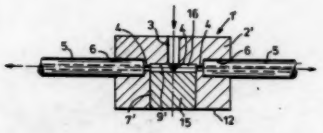
**Filed Apr. 8, 1986, Ser. No. 849,573**

**Claims priority, application Fed. Rep. of Germany, Apr. 17, 1985, 3513777**

**Int. Cl.[4] F02M *35/10*; F02D *9/02***

**U.S. Cl. 137—561 A** **14 Claims**




1. A device for uniform distribution of a two-phase flow containing a liquid and a gaseous component, in particular a fuel-air mixture in a mixture delivery arrangement of an automobile, with a flow-in line bore arranged centrally in a housing and with a plurality of flow-out line bores arranged within a plane extending essentially perpendicularly to the flow-in line and connected with the flow-in line bore, whereby the flow-in line bore is bounded by the end face of an obturating body pressed into a retaining bore arranged in the housing coaxially with the flow-in line bore but beyond the plane of the flow-out line bores, characterized in that the retaining bore is provided, in the region of the connection between the flow-in line bore and the flow-out line bore, with a substantially larger diameter than the flow-in line bore, and in that between the end face of the obturating body and the bottom of the retaining bore is formed a distribution space in the form of a narrow gap into which open the flow-out line bores.

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**4,712,582**

**REVERSING VALVE ASSEMBLY WITH IMPROVED PILOT VALVE MOUNTING STRUCTURE**

**Robert T. Marks, Columbus, Ohio, assignor to Ranco Incorporated, Dublin, Ohio**

**Continuation of Ser. No. 652,833, Sep. 20, 1984, abandoned. This application Feb. 9, 1987, Ser. No. 15,507**

**Int. Cl.[4] F16K *31/42, 11/00***

**U.S. Cl. 137—625.29** **11 Claims**

1. A refrigerant reversing valve assembly comprising:

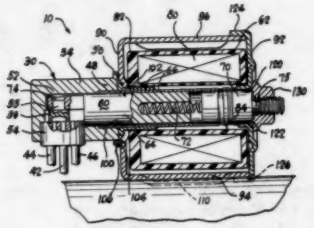
(a) a fluid pressure actuatable reversing valve for reversing the direction of refrigerant flow in a refrigeration system;

(b) a pilot valve unit for controlling actuation of said reversing valve comprising a pilot valve housing in fluid com-

munication with said reversing valve, a pilot valving member in said housing, and pilot valve actuating means comprising a pilot valving member actuating plunger coupled to the pilot valving member, a guide tube surrounding said plunger connected to said pilot valve body and projecting therefrom, and a solenoid surrounding said guide tube for actuating said plunger; and

(c) supporting means for interconnecting said reversing valve and said pilot valve unit, said supporting means comprising:

(i) anchoring panel means fixed with respect to said reversing valve and attached to said pilot valve unit for securing said reversing valve and said pilot valve unit together with said plunger guide tube projecting away



from said anchoring panel means, said anchoring panel means engageable with said solenoid and including a projecting hub extending into said solenoid for supporting said solenoid in position about said guide tube; and

(ii) retainer panel means detachably connected to the guide tube projecting end region remote from said anchoring panel means, said retainer panel means detachable to enable placement of said solenoid about said guide tube and connected to said guide tube for maintaining said solenoid in position with respect to said guide tube and engaged between said anchoring and retaining panel means, said retainer panel means including a projecting hub extending into said solenoid for supporting said solenoid in position about said guide tube.

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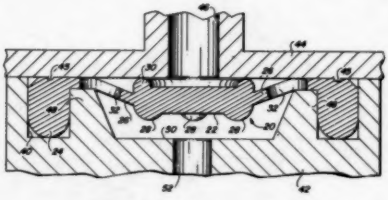
**4,712,583**

## PRECISION PASSIVE FLAT-TOP VALVE FOR MEDICATION INFUSION SYSTEM

**John P. Pelmulder, Chatsworth; Lanny A. Gorton, Sunland; Armen J. Guleserian, Simi Valley, and John H. Livingston, Santa Monica, all of Calif., assignors to Pacesetter Infusion, Ltd., Sylmar, Calif.**

**Filed May 27, 1986, Ser. No. 867,824**
**Int. Cl.[4] F16K *15/14***
**U.S. Cl. 137—852** **17 Claims**



1. A one-way precision valve for medical applications, said valve for mounting between an upper housing portion having an essentially flat surface with an inlet aperture therein and a lower housing portion having an outlet portion therein, said valve being of one-piece manufacture and comprising:

a rigid circular valve disk, wherein said valve disk is so arranged and configured as to be of a thickness sufficiently substantial to prevent said valve disk from exhibiting a significant amount of flexure even under high reverse pressure;

a cylindrical dynamic sealing ridge protruding from the top side of said rigid circular valve disk, said dynamic sealing ridge for providing a sealing contact with said flat surface of said upper housing portion around said inlet aperture when said valve disk is urged toward said upper housing portion;

a static seal ring for installation between said upper and lower housing portions in sealing fashion, said static seal ring being located circumferentially around and spaced away from said valve disk; and

a relatively thin support web extending between said static seal ring and said valve disk for supporting said valve disk from said static seal ring, said support web being flat when in an unbiased position, said support web supporting said dynamic sealing ridge on said valve disk in position around said inlet aperture, said dynamic sealing ridge being located above the surface of said support web, said support web being elastomeric and functioning to bias said valve disk toward said upper housing portion to maintain said dynamic sealing ridge against said upper housing portion around said inlet aperture in sealing fashion until and unless a predetermined forward pressure drop exists across said valve, said support web having disposed therein a plurality of apertures to allow the passage of fluid therethrough.

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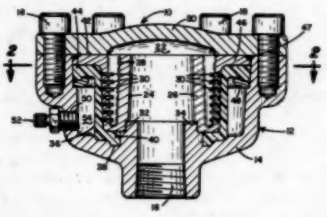
**4,712,584**

## SURGE SUPPRESSOR

**Ramon Pareja, Edina, Minn., assignor to Lear Siegler, Inc., Santa Monica, Calif.**

**Filed Dec. 8, 1986, Ser. No. 939,010**
**Int. Cl.[4] F16L *55/04***
**U.S. Cl. 138—30** **12 Claims**



1. A surge suppressor for suppressing undesired pressure surges in a fluid handling system comprising:

(a) a housing having a fluid inlet port leading to a hollow chamber;

(b) a rigid baffle member disposed in said hollow chamber and having a generally cylindrical tubular wall coaxially aligned with said fluid inlet port in said housing, said baffle member including a plurality of radially spaced bores extending longitudinally inwardly into said cylindrical wall, the length of said bores being less than the length of said tubular wall, said bores being exposed to a working fluid through said fluid inlet port in said housing, said cylindrical tubular wall having a plurality of longitudinally spaced, radially extending slits formed through the exterior surface thereof and intersecting with said bores;

(c) a generally tubular diaphragm formed from an elastomeric material and surrounding said generally cylindrical tubular wall of said rigid baffle member and clamped with respect to said baffle member and said housing so as to be sealed against fluid flow at the opposed end portions of said elastomeric tubular diaphragm; and

(d) means for introducing a compressible fluid at a predeter-

mined pressure between said housing and the exterior wall of said generally tubular elastomeric diaphragm.

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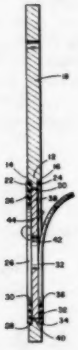
4,712,585

## ORIFICE PLATE HOLDER

Richard B. Evans, Tulsa, Okla., assignor to Red Man Pipe and Supply Company, Tulsa, Okla.

Filed Oct. 10, 1986, Ser. No. 917,665
Int. Cl.[4] F16L *55/10*
U.S. Cl. 138—44 6 Claims



1. An orifice forming assembly for insertion between juxtaposed flanges, comprising:

a plate body portion of rigid material having first and second opposed planar surfaces and having an opening therethrough;

a first elastomeric washer member having an outer diameter greater than said plate body portion opening and an inner diameter less than said plate body portion opening, the first elastomeric washer member being secured to said first body portion planar surface coaxially with said body portion opening;

a second elastomeric washer member contacting said second body portion planar surface, said second elastomeric washer having an outer diameter greater than said plate body portion opening and an inner diameter less than said plate body portion opening, approximately one-half of the second elastomeric washer member contacting surface being secured to said second body portion planar surface coaxially with said body portion opening, the unsecured portion being resiliently deflectable away from said body portion second planar surface; and

an orifice plate insert of rigid material having first and second opposed planar surfaces and of an outer diameter less than said opening through said plate body portion and larger than said elastomeric washer members inner diameters and having a central orifice hole therethrough, the orifice plate insert being removeably inserted into said opening in said plate body portion and between said elastomeric washer members, said plate body portion, said elastomeric washer members and said orifice plate being insertable and removeable as a unit between juxtaposed flanges.

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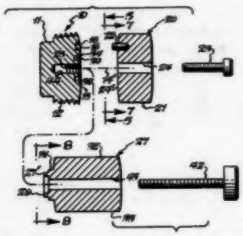
4,712,586

## PIPE PLUG AND CENTERING CONSTRUCTION FOR CENTERING RIDGED KEY IN MATING GROOVE IN PIPE PLUG

Durham S. McCauley, and Jeffrey R. Sullivan, both of Boston, N.Y., assignors to McGard, Inc., Buffalo, N.Y.

Continuation of Ser. No. 732,675, May 10, 1985, abandoned.
This application Aug. 27, 1986, Ser. No. 900,975
Int. Cl.[4] F16L *55/10*
U.S. Cl. 138—89 13 Claims



1. A pipe plug which is installable in a pipe by the use of a first key which cannot be used to remove the pipe plug from the pipe and which is removable from the pipe only by the use of a second key comprising a body having an axis, threads on said body, a face on said body, a plurality of arcuate ramps on said face, said arcuate ramps being oriented about said axis, each of said ramps having a first end and a second end and a surface which leads away from said face and which extends a greater distance into said body as it progresses toward said second end from said first end and terminates at shoulder means at said second end for receiving said first key in abutting relationship for tightening said plug to install it when said first key is turned in a first direction but said first key camming out of said ramps without loosening said pipe plug to remove it when said first key is moved in an opposite second direction away from said shoulder means, said threads on said body having a tightening direction which is the same as the direction of said ramps leading toward said shoulder means, and curvilinear key-receiving groove means in said face for receiving said second key for removing said plug, said curvilinear groove means being oriented about said axis.

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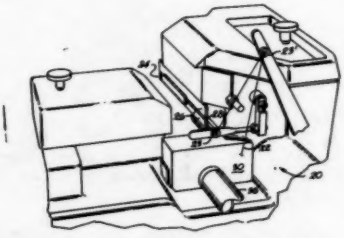
4,712,587

## CLEANING AND YARN CONDITIONING SYSTEM FOR WEAVING MACHINES

Walker O. Graham, 105 Sycamore Dr., Mauldin, S.C. 29662

Filed Aug. 4, 1986, Ser. No. 892,906
Int. Cl.[4] D03J *1/04*
U.S. Cl. 139—1 C 20 Claims



1. A cleaning and weft conditioning system for a weaving machine which has a warp supply, harnesses having a plurality of heddles, a reed supported on a sley, means for selectively raising and lowering the heddles and the warp yarns passing

from said warp supply through said heddles and through said reed to form warp sheds, a weft insertion system, and a loading station whereat weft yarns are loaded into said weft insertion system and are picked through said warp sheds for forming a fabric, said cleaning and weft conditioning system comprising:

(a) a first vacuum chamber disposed adjacent to the weft loading station;

(b) at least one hollow, elongated vacuum chamber extending from one side of said first vacuum chamber and in pneumatic communication therewith, with a free end of said elongated chamber being closed, said elongated chamber further having a narrow slot extending longitudinally along said hollow, elongated vacuum chamber, and along at least a part of the path on which weft yarns are loaded into the weft insertion system, so as to draw air from the ambient atmosphere across the weft yarn and across adjacent surfaces of the loading station and the weaving machine, whenever a partial vacuum is created in said vacuum chambers; and

(c) means for creating a partial vacuum within said vacuum chambers thereby causing a portion of the ambient atmosphere of the weave room to be drawn across the weft yarn at the loading station to condition it and across adjacent surfaces of said weaving machine to remove lint, fly, size or the like from said surfaces.

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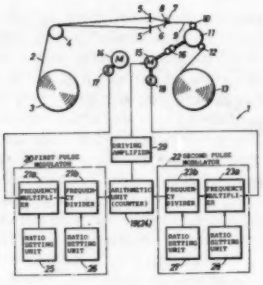
**4,712,588**

## PICK SPACING CONTROLLING DEVICE AND METHOD

**Tsutomu Sainen, Kanazawa, Japan, assignor to Tsudakoma Corp., Ishikawa, Japan**

**Filed Sep. 11, 1986, Ser. No. 906,261**
**Claims priority, application Japan, Sep. 11, 1985, 60-199539**
**Int. Cl.[4] D03D *49/20***
**U.S. Cl. 139—309** **4 Claims**



1. A pick spacing controlling device for controlling the pick spacing of a fabric being woven on a loom having a main motor for driving a principal weaving mechanism of the loom and having a take-up motor for driving a take-up roller for the fabric by controlling the take-up motor so that the amount of rotation of the take-up motor during a given time interval is directly proportional to that of the main motor, comprising:

a first rotation amount detector which provides a first number of digital pulses proportional to the amount of rotation of the main motor during said given time interval;

a second rotation amount detector which provides a second number of digital pulses proportional to the amount of rotation of the take-up roller during said given time interval;

a first pulse number modulator which digitally modulates the first number of pulses from the first rotation amount detector by a predetermined ratio;

a second pulse number modulator which digitally modulates the second number of pulses from the second rotation amount detector by a predetermined ratio;

an arithmetic unit which digitally calculates the difference between the number of pulses output by the first pulse number modulator and the number of pulses output by the second pulse number modulator during said given time interval; and

a driving amplifier which is responsive to the arithmetic unit and controls the amount of rotation of the take-up motor so as to reduce said difference toward zero.

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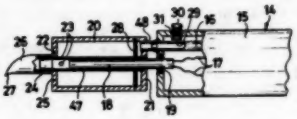
**4,712,589**

## EQUIPMENT FOR THE HANDLING OF SUBSTANCES MADE FLUID BY HEATING, IN PARTICULAR WAX FOR MODELS

**Giovanni De Gaspari, Via Lago, 2, 20090 Rodano (Milan), Italy**

**Filed Feb. 18, 1986, Ser. No. 830,011**
**Claims priority, application Italy, Feb. 20, 1985, 19581 A/85**
**Int. Cl.[4] A61C *13/20***
**U.S. Cl. 141—25** **11 Claims**



1. Apparatus for handling a liquid through the selective utilization of negative and positive air pressure comprising a body defining a chamber, filter means for separating said chamber into a liquid chamber and an air chamber, said filter means further precluding the passing of liquid therethrough, means for introducing air into and withdrawing air from said air chamber, means for drawing liquid into and ejecting liquid from said liquid chamber in response to the respective withdrawal and introducing of air into said air chamber, means for heating the liquid while in the liquid chamber, a tube within at least said liquid chamber in fluid communication with said liquid drawing and ejecting means, and at least one bore in said tube placing said tube in fluid communication with said liquid chamber.

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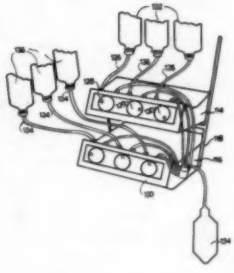
**4,712,590**

## ELECTRICAL CONNECTION MEANS FOR MULTIPLE BULK COMPOUNDING SYSTEMS

**Aleandro Di Gianfilippo, Crystal Lake, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.**

**Filed May 30, 1986, Ser. No. 868,974**
**Int. Cl.[4] B65B *3/30***
**U.S. Cl. 141—83** **9 Claims**



1. A device for connecting multiple bulk compounding systems together in which each bulk compounding system precisely controls fluid transfer of at multiple solutions to a single receiving container, each solution being contained in a separate source container, each bulk compounding system including:

a manifold having an outlet fluid line in fluid communication with said receiving container;

a plurality of fluid lines, each source container being in fluid communication with one of said fluid lines each of said fluid lines being in fluid communication with said manifold;

pumping means for pumping solution in said plurality of fluid lines from each of said source containers to said receiving container;

control means, including first means for sensing the weight of fluid in said receiving container, and second means including a peripheral interface means, said peripheral interface means having a first set of input signals for selecting an amount of fluid to be transferred from each source container to said receiving container, said peripheral interface means also having a first set of output signals for displaying the amount of solution to be transferred, and a second set of output signals for controlling said pump means to deliver a predetermined amount of solution from said source to said receiving container in response to the amount of fluid sensed in said container, wherein the improvement comprises:

first electronic connector means for electronically connecting together said second set of output signals from more than one bulk compounding system to cause said plurality of bulk compounding systems to transfer said selected amount of fluids from said source containers to said single receiving container, said connector means having a multiplexer means for receiving said second set of output signals from each of said bulk compounding systems, and for generating a plurality of output signals to activate said pumping means for each of said bulk compounding systems.

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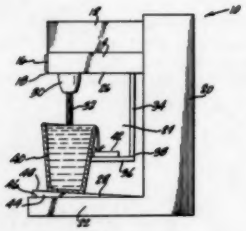
**4,712,591**

**LIQUID DISPENSER WITH AUTOMATIC SHUT-OFF**

**Gerald P. McCann, Los Angeles; Andrew J. Holoubek, Valencia, and Donald Verley, Saugus, all of Calif., assignors to McCann's Engineering and Manufacturing Co., Los Angeles, Calif.**

**Filed Mar. 18, 1986, Ser. No. 840,895**
**Int. Cl.[4] B65B *3/04***
**U.S. Cl. 141—88** **27 Claims**



18. A drink dispenser assembly used for filling a receptacle when placed into a position to receive liquid dispensed from a nozzle attached to a faucet assembly comprising:

a support tower operative to suspend the nozzle,

a base attached to said support tower,

a feedline operative to convey liquid to the nozzle,

a valve disposed in said feedline,

a solenoid operative with said valve,

an electric circuit operative with said solenoid to open or close said valve,

switch means for actuating said electric circuit and said solenoid to open said valve and initiate a filling cycle,

a ramp attached to said base, wherein said ramp is operative to position the receptacle below the nozzle in an inclined condition,

retaining means attached to said support tower for locating the receptacle below the nozzle,

means for sensing the filled condition of the receptacle, said sensing means including means for deactuating said electric circuit and said solenoid to close said valve and terminate the filling cycle, said sensing means positioned to receive overflow from the receptacle at a defined location below the rim of the receptacle.

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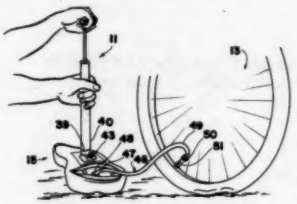
**4,712,592**

**BICYCLE PUMP APPARATUS**

**Alexander N. Brown, 363 Kootenai Creek Rd., Stevensville, Mont. 59870**

**Filed Nov. 10, 1986, Ser. No. 928,373**
**Int. Cl.[4] B65B *3/04***
**U.S. Cl. 141—98** **12 Claims**



1. Bicycle pump/seat post apparatus including a cylinder portion, a piston portion, a handle portion, a seat mounting portion and an air discharge portion; said cylinder portion including an elongated tubular seat post section, said tubular section having an external diameter slidably engageable snugly with a seat post receiving section of a bicycle frame; said piston portion including an elongated rod member disposed within said tubular section along a centerline thereof, said rod member having a length slightly longer than said tubular section, a transverse plunger member affixed adjacent one end of said rod member, said plunger member having a diameter substantially equal to the internal diameter of said tubular section to provide a snug fit therebetween, a transverse guide section disposed adjacent an opposite end of said tubular section aligning and maintaining said rod member along the centerline thereof; said handle portion including a grip member connected to an end of said rod member that extends outwardly beyond said guide section, said grip member having an exterior diameter not more than that of the external diameter of said tubular section; said seat mounting portion including a central section engageable with an end of said tubular section remote from said handle portion, a passage through said central section, flange sections extending from said central section connectable with an underside of a bicycle seat; said air discharge portion including a length of flexible tubing, one end of said tubing being attached to an end of said mounting portion passage remote from said cylinder portion, an opposite end of said tubing including a fitting connectable to a tire valve; whereby said pump/seat post apparatus can be secured within said seat post receiving section of a bicycle frame and a seat affixed to said seat mounting portion with said tubing within said seat, and said pump apparatus can be used to inflate a tire by withdrawing same from said frame section and inverting it, positioning said apparatus adjacent said tire resting on said seat as a base, attaching said fitting to a tire valve and reciprocating said piston portion to force air along said tubing into said tire.

**4,712,593**

## APPARATUS FOR THE METERED REMOVAL OF PASTY OR FLUID SUBSTANCES

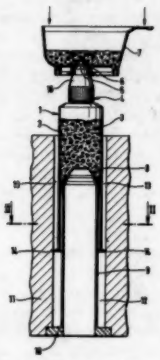
**Karlheinz Zulauf, Höchst-Hassenroth, and Lothar Breuer, Klein-Bieberau, both of Fed. Rep. of Germany, assignors to Wella Aktiengesellschaft, Darmstadt, Fed. Rep. of Germany**

**Continuation of Ser. No. 577,122, Feb. 6, 1984, abandoned. This application Nov. 6, 1985, Ser. No. 796,486**

**Claims priority, application Fed. Rep. of Germany, Mar. 18, 1983, 3309692**

**Int. Cl.[4] B65B 3/04**

**U.S. Cl. 141—113** **4 Claims**



1. Apparatus for the metered removal of a pasty or fluid substance, comprising:

a storage container for the pasty or fluid substance having a cylindrical body with an opened lower end and an upper end, and an outlet nozzle for discharge of the substance disposed at said upper end;

a plunger disposed in said body of said storage container and being upwardly displaceable relative to said storage container to exert a feed pressure on said body of said storage container;

a piston rod for actuating said plunger and having a support foot integral with the piston rod projecting from below into said storage container and bearing removably on said plunger;

a base plate containing a substantially cylindrical chamber which receives said piston rod, the support foot of which is anchored in said base plate, said cylindrical chamber receiving said piston rod, said plunger and said storage container so that they are coaxial and concentrical with each other and said base plate;

a mixture container positioned exteriorly of said base plate and having a one piece self-closing bottom valve into which said outlet nozzle of said storage container is insertable, said bottom valve being openable upon insertion of said outlet nozzle to discharge the substance into said mixing container and closeable upon removal therefrom to prevent leakage of the substance from said mixing container by an annular sealing seat for said outlet nozzle;

a closure valve disposed within said outlet nozzle of said storage container and having a valve actuation cap arranged to actuate said closure valve by rotational movement relative to said storage container, said closure valve being closable by rotation of said valve actuation cap so that after removal of said outlet nozzle from said self-closing bottom valve the substance in said storage container is sealed from contamination, said valve actuation cap having an exterior conical sealing seat which communicates with said self closing bottom valve of said mixing container to form a continuous closed seal during discharge of the substance into said mixing container; and

straight guide means for guiding said storage container in said chamber.

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**4,712,594**

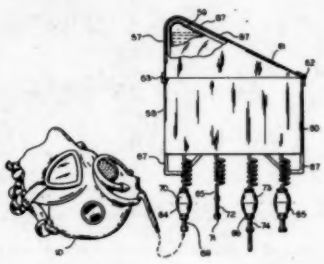
## LIQUID STORAGE AND DELIVERY SYSTEM FOR PROTECTIVE MASK

**Wesley Schneider, 1030 N. State Pkwy., Apt. 50-F, Chicago, Ill. 60610**

**Continuation-in-part of Ser. No. 654,121, Sep. 26, 1984, abandoned, which is a continuation-in-part of Ser. No. 462,614, Jan. 31, 1983, Pat. No. 4,503,310. This application Jan. 23, 1986, Ser. No. 821,792**

**Int. Cl.[4] B65B 3/04**

**U.S. Cl. 141—114** **24 Claims**



16. Apparatus for introducing a liquid into a system, said system of the type including a protective mask having a drinking mouth piece assembly on the interior thereof, positionable at the mouth of a user for ingestion of said liquid, a portable canteen for the storage of an initial quantity of said liquid, a connecting tube extending from said canteen to said drinking mouth piece assembly, a mask connector joining said connecting tube to said drinking mount piece assembly, and a canteen connector joining said connecting tube to said canteen, said apparatus comprising:

a flexible, impermeable storage bag within which said liquid is disposed without exposing said liquid to the atmosphere;

at least one first coupling formed liquid-tightly on said storage bag,

each of said first coupling adapted to selectively and liquid-tightly receive one said mask connector;

means for selectively refilling said canteen from said bag,

said refilling means including at least one second coupling formed liquid-tightly on said bag,

each said second coupling adapted to selectively and liquid-tightly receive one said canteen connector,

said bag, one said first connector, and said mask connector creating a closed delivery path for said liquid from said bag to said drinking mouth piece assembly; and

said bag, one said second connector, and said canteen, creating a closed delivery path for said liquid from said bag to said canteen.

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**4,712,595**

## MAGNETIC SAFETY FUNNEL

**Harold L. Wilson, P.O. Box 394, Pevely, Mo. 63070**

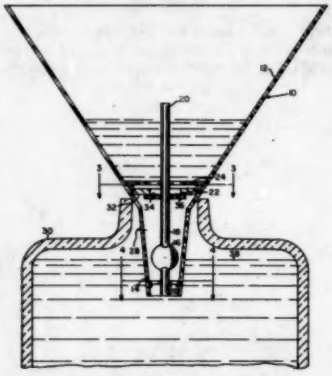
**Filed Aug. 15, 1986, Ser. No. 897,131**

**Int. Cl.[4] B65B 3/06**

**U.S. Cl. 141—201** **5 Claims**

1. A safety funnel to prevent fluid overfill of a container, said funnel comprising a reservoir body and a depending elongated spout, a float member supported by an elongated member connected to the funnel and extending in said funnel spout, valve means operable by said float member to open and close the flow of fluid through the spout said float member being responsive to immersion in the fluid level in the container to be filled to operate said valve means to a closed position, a mag-

netic member to maintain said valve means in a closed position, said magnetic member comprising a magnet fixed to the funnel and a metallic member fixed to the elongated member, said metallic member being movable with the float member upon immersion of the float member at fluid level toward said magnet to close said valve means and maintain it closed upon removal of the funnel, said float member being connected to



said elongated member inside said spout and receivable in said spout in protected relation in opened and closed valve means position and a top strainer member and a bottom strainer member fixed adjacent an upper and lower portion of the spout and having a central openings slidably receiving in guided relation said elongated member, said float member being receivable in said spout between said top and bottom strainer members to provide said protected relation.

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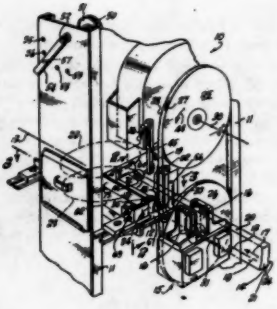
**4,712,596**

## LUMBER SURFACING MACHINE

**Tom McClaran, 1042 Turndell Rd., La Habra, Calif. 90631**

**Filed Feb. 5, 1987, Ser. No. 11,311**
**Int. Cl.[4] B27C 9/00**
**U.S. Cl. 144—3 R** **18 Claims**



**18.** A lumber surfacing machine for roughening the surface of at least one face of a length of lumber, said machine comprising:

a frame including a generally horizontal lumber-supporting bed, said lumber-supporting bed having a longitudinal axis which is parallel to the direction in which lumber is moved along said bed and said frame being positionable adjacent lumber feeding means for feeding lumber to the machine;

an upper saw wheel supported by said frame above the lumber-supporting bed;

a lower saw wheel supported by said frame below the lumber-supporting bed, at least one of said saw wheels being a driven wheel and both of said saw wheels having an axis of rotation which is parallel to the longitudinal axis of the lumber-supporting bed;

a band saw blade having teeth along its cutting side and having a smooth side, said blade being held over the top half of the upper saw wheel and held around the lower half of the lower saw wheel;

upper and lower blade guides held by said frame, the upper blade guide being above the lumber-supporting bed and the lower blade guide being below the lumber-supporting bed and each of the blade guides having a flat outer surface including a blade-supporting ridge extending above the flat outer surface so that the blade guides have a ridge edge and a flat edge and the band saw blade being held against the flat outer surface so that its smooth said abuts each ridge and each of said blade guides being parallel to one another and being supported so that an acute angle is formed between the flat surface and the longitudinal axis of the lumber-supporting bed, said acute angle having its apex at the smooth edge of the flat surface and said guides being positioned so that said band saw blade has a cutting length between the guides which is adjacent the lumber-supporting bed and perpendicular to the longitudinal axis of the bed; and

opposing guide means held by said frame and said opposing guide means having a guide surface parallel to the cutting length so that lumber fed into the machine will have one surface held against the guide means and the opposite surface held against the teeth of the band saw and roughened by the teeth thereof.

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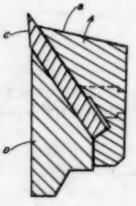
**4,712,597**

## KNIFE HOLDER FOR WOOD CHIPPERS

**George E. Stringer, Box 450, Tylertown, Miss. 39667**

**Filed Mar. 27, 1986, Ser. No. 844,697**
**Int. Cl.[4] B27C 1/14**
**U.S. Cl. 144—176** **4 Claims**



**1.** Am improved knife holder for wood chippers of the type having a series of substantially radially positioned knives mounted on a rapidly rotatable disc wherein the improvement comprises combining the knife holder and counter knife presently used into one unit, said knife holder comprising one solid piece of steel with a flat surface secured to the base of the chipper disc by one or more bolts mounted within a recess in the flat surface of the chipper disc and having an adjacent surface which extends outward from the chipper disc at an angle of between 90 degrees and 150 degrees from the flat surface which abuts the chipper disc, which surface is the wear surface of the holder in that chips are impelled against this surface during the operation of the chipper, causing the surface to wear, to a desired distance from the chipper disc at which point another flat surface extends at a desired angle of between 30 degrees and 90 degrees therefrom, which surface includes a shallow recess located at one end of the length of the surface, to a point where it meets another surface which extends at an angle of 90 degrees therefrom to a point which is immediately adjacent to a knife clamp utilized to clamp the knife in position between the knife holder and clamp, said surfaces forming a recess into which the chipper knife is mounted and secured

through clamping action between the knife clamp and knife holder.

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**4,712,598**

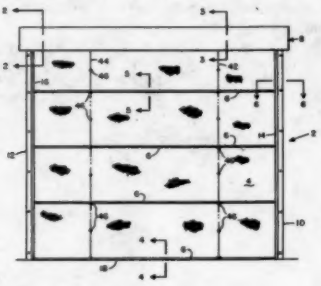
## SCREEN DOOR ASSEMBLY

**Stephen T. Bonacci, 202 Mitchell Ave.; Richard L. Douville, 3322 W. Third Ave., and Rodger C. Winter, Rte. #1-Box 119E, all of Hibbing, Minn. 55746**

**Filed Oct. 17, 1986, Ser. No. 920,068**

**Int. Cl.[4] E06B *3/94***

**U.S. Cl. 160—84 R** **9 Claims**



1. A ventillated cover for a garage door opening comprising:

(a) a screen curtain sized to extend beyond the sides and top of said opening and having a plurality of horizontally disposed cord members sewn thereto, wherein a topmost edge is mounted in sealed external relation above the top of said opening and a bottommost edge is hemmed to support a horizontally disposed weighted rod and beneath which a compressible seal member is mounted, wherein each of a plurality of rings are attached to the face of said curtain in vertical columns and wherein the curtain sides are hemmed and grommets are set therein at the outer hem edges in alignment with each cord and the ends of which cords are threaded through each of said grommets;

(b) a pair of vertical track members mounted in sealed external relation to the sides of said opening, each track member including a vertical flanged slideway and a flexible vertical seal member positioned to angulate from an outer track edge;

(c) a plurality of slide clip members, each secured to an end of one of said cord members and slidably constrained in one of said vertical tracks; and

(d) draw pulley means including a plurality of vertically disposed draw cords threaded through said rings for raising and lowering said curtain and such that said bottom compressible seal conformally engages the ground and said track mounted seals contact said curtain when fully lowered.

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**4,712,599**

## SHUTTER

**Toshiro Komaki, Tokyo, Japan, assignor to Tachikawa Corporation, Tokyo, Japan**

**Filed Jun. 19, 1985, Ser. No. 746,830**

**Claims priority, application Japan, Mar. 7, 1984, 59-44277[U]; Jul. 2, 1984, 59-99729[U]**

**Int. Cl.[4] A47G *5/02*; E06B *9/202***

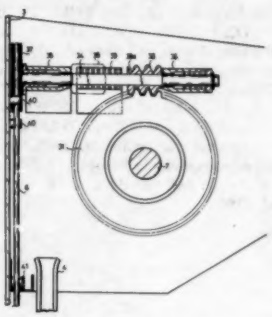
**U.S. Cl. 160—133** **10 Claims**

1. A shutter comprising:

a plurality of slats extending laterally and vertically expandably coupled together, each slat including a main portion and an expandable portion having slits therein;

a take-up shaft device including an immovable core shaft, a rotary member rotatably mounted on said core shaft, one of said slats being attached to said rotary member for winding the slats onto and unwinding the slats from the rotary member, and a spring connected between the core shaft and the rotary member for turning the rotary member to wind the slats thereonto; and

slit open-close means for expanding and contracting said slats to open and close the slits, said slit open-close means including a worm-wheel mounted on said core shaft to



rotate together with said rotary member, a worm-gear situated adjacent to the worm-wheel so that the worm-gear can engage with and disengage from the worm-wheel, and shifting means connected to the worm-gear for shifting the worm-gear to engage with and disengage from the worm-wheel and moving the slats to completely close the slits by rotating the rotary member.

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**4,712,600**

## PRODUCTION OF PISTONS HAVING A CAVITY

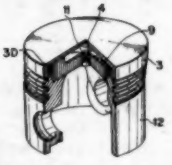
**Kaneo Hamajima, Nagoya; Tadashi Dohnomoto, Toyota; Atsuo Tanaka, Toyota, and Masahiro Kubo, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed Jul. 9, 1986, Ser. No. 883,825**

**Claims priority, application Japan, Jul. 12, 1985, 60-153640; Jul. 22, 1985, 60-161377; Jul. 25, 1985, 60-164822**

**Int. Cl.[4] B22D *18/02, 19/00, 19/14, 29/00***

**U.S. Cl. 164—97** **24 Claims**



1. A method for producing a piston of a light alloy matrix metal having a cavity within its head by pressure casting, comprising the steps of:

preforming a precursory member having the shape of said cavity from an extractable material which remains in solid state at room temperature and is convertible into a fluid at a heating temperature below the melting point of the matrix metal,

disposing said precursory member in place in a pressure casting mold having a cavity corresponding to the shape of the piston, while covering said precursory member with a porous member stable to molten matrix metal,

pouring molten matrix metal into the mold cavity and applying a pressure thereto to form a piston-shaped casting having said precursory member and said porous member embedded therein, and

heating said casting at a temperature below the melting point

of said matrix metal and above the fluidizing temperature of the material of said precursory member to convert the precursory member material into a fluid, and extracting said fluid from said casting, leaving a cavity at the location of said precursory member.

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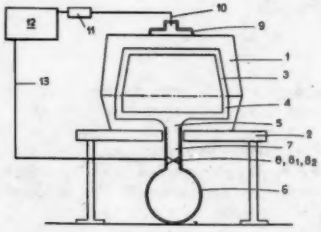
4,712,601

## PROCESS AND APPARATUS FOR AUTOMATING A BAKING CYCLE UNDER HOT AIR OF SAND MOLDS

Pierre L. Merrien, Billere, and Pierre A. Merrien, Sceaux, both of France, assignors to Etude et Development en Metallurgie, Billere, France

Division of Ser. No. 631,521, Jul. 18, 1984, Pat. No. 4,573,522, which is a continuation of Ser. No. 210,623, Nov. 26, 1980, abandoned. This application Jul. 16, 1985, Ser. No. 755,687
Claims priority, application France, Nov. 28, 1979, 79 29227
Int. Cl.[4] B22C *9/14*
U.S. Cl. 164—150 16 Claims




1. An apparatus for ensuring the proper removal of volatile organic materials from a sand mold, wherein said apparatus comprises:

(a) means for determining the optimal concentration of volatile organic materials evaporating from said sand mold as a function of time during the drying of said sand mold;

(b) means for heating said sand mold before casting in such a manner that the concentration of volatile organic materials as a function of time evaporating from said mold during drying before casting is substantially the same as said optimal volatile organic material concentration as a function of time.

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4,712,602

## POOL-LEVEL SENSING PROBE AND AUTOMATIC LEVEL CONTROL FOR TWIN-BELT CONTINUOUS METAL CASTING MACHINES

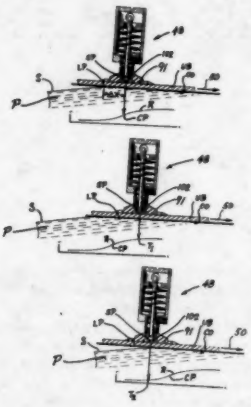
Timothy D. Kaiser, Colchester, and Gary P. Ackel, Burlington, both of Vt., assignors to Hazelett Strip-Casting Corporation, Colchester, Vt.

Filed Sep. 11, 1986, Ser. No. 906,256
Int. Cl.[4] B22D *11/18*
U.S. Cl. 164—453 18 Claims

1. In a continuous metal-casting machine having an input region for introducing molten metal into a pool P of molten metal having an upper surface S and wherein flow-control means control the rate of introducing molten metal into said pool, said casting machine employing at least one moving flexible casting belt having a front face for contact with the molten metal in said pool and a reverse face which is cooled by aqueous coolant having an incoming temperature and wherein said casting belt travels downstream in the machine at a controllable travel rate for carrying metal downstream from said pool to become solidified and wherein the temperature of each point on the reverse face of the traveling belt rises from an initial temperature prior to contact with the molten metal to a steady state temperature after remaining in contact with the molten metal, said rise in temperature of each such point occurring along a ramp R of ascending temperature as each opposite point on the front face travels downstream from initial contact with the molten pool surface S, and wherein the physical position of said ramp R of ascending temperature moves upstream and downstream as said pool surface moves upstream and downstream, the method for controlling the elevation level of said pool surface S as the casting machine is operating comprising the steps of:

selecting a desired elevation-level control-point LP for said molten pool surface S during operation of the casting machine,

selecting a sensing point SP for sensing the temperature of the reverse face of the traveling belt to be a small distance $\Delta x$ in the downstream direction from said desired level-control point LP,




said small distance being predetermined to be at a control-point temperature CP within a predetermined range of temperature $\Delta T$ on said ramp R of ascending temperature,

positioning the sensitive area of a signal-producing thermal probe against the reverse face of the traveling belt at said selected sensing point SP for causing the thermal probe to provide a signal increasing in value as said ramp R of ascending temperature moves upstream and decreasing in value as said ramp R of ascending temperature moves downstream,

and using the value of the signal from said thermal probe for controlling said flow control means for controlling the rate of flow of molten metal into said pool for controlling the elevation level of said pool surface S to be near said selected elevation level control point LP.

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4,712,603

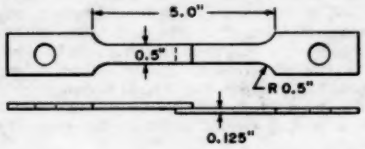
## METHOD OF MAKING A NICKLE HIGH-CHROMIUM BASE BRAZING FILLER METAL

Debasis Bose, Randolph, and Alfred Freilich, Livingston, both of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Division of Ser. No. 710,343, Mar. 11, 1985, Pat. No. 4,658,531, which is a division of Ser. No. 441,465, Nov. 15, 1982. This application Nov. 17, 1986, Ser. No. 931,320
Int. Cl.[4] B22D *11/06*
U.S. Cl. 164—463 3 Claims

1. A process for fabricating homogeneous ductile foil having a composition consisting essentially of 17 to 20 atom percent chromium, 4 to 10 atom percent boron and 10 to 16 atom percent silicon, the balance being nickel and incidental impuri-

ties and the total of nickel and chromium ranging from about 74 to 84 atom percent, which process comprises forming a melt




of the compositon and quenching the melt on a moving chill surface at a rate of at least about $10^5$ °C./sec.

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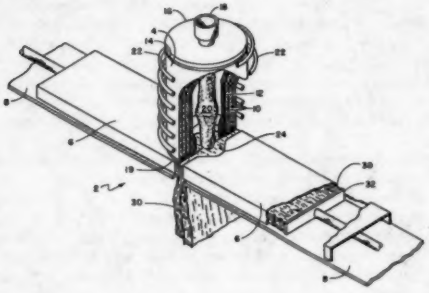
**4,712,604**

## APPARATUS FOR CASTING DIRECTIONALLY SOLIDIFIED ARTICLES

**Thomas F. Sawyer, Charlton, N.Y., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Oct. 14, 1986, Ser. No. 917,934**
**Int. Cl.[4] B22D *27/04***
**U.S. Cl. 164—513** **8 Claims**



1. Apparatus for casting an article comprising:
heating chamber means for enveloping a mold and for establishing a heating zone thereabout;
mold support means for supporting said mold within said heating chamber means and for withdrawing said mold from said heating chamber means;
insulative material having its fibers arranged in a flexible blanket form; and
tunnel means positioned below said heating chamber means, said tunnel means containing said insulative material and urging said material against said mold to cover said mold as it is extracted from said heating chamber means.

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**4,712,605**

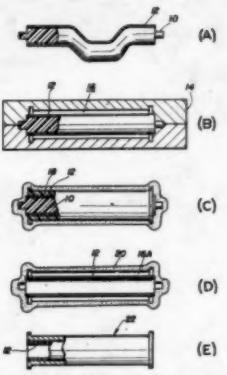
## PROCESS FOR PRODUCING HOLLOW CAST ARTICLE

**Nobuyoshi Sasaki; Susumu Baba, and Hisahiro Arai, all of Yokohama, Japan, assignors to M.C.L. Co., Ltd., Japan**

**Filed Jan. 12, 1987, Ser. No. 2,006**
**Claims priority, application Japan, Jan. 27, 1986, 61-13871**
**Int. Cl.[4] B22C *9/04*; B22D *19/16***
**U.S. Cl. 164—516** **19 Claims**

1. A process for producing a hollow metal cast product comprising the steps of preparing a first lost model having an outer contour substantially corresponding to a desired interior contour of the finished product, depositing a molten metal or alloy over the surface of said first lost model by spraying to form a metal layer defining a hollow core block, placing said hollow core block in a first mold, pouring or injecting a material for forming a second lost model into said first mold to form a second lost model layer, coating a refractory material over said second lost model layer to form a second mold for casting, removing said second lost model to form a cavity, casting a molten metal or alloy into said cavity, and staving said second mold to take out a finished product.

7. A process for producing a hollow metal cast product comprising the steps of preparing a first lost model having an outer contour substantially corresponding to a desired interior contour of the finished product, depositing a molten ceramic material over the surface of said first lost model by spraying to form a ceramic layer defining a hollow core block, placing said hollow core block in a first mold, pouring or injecting a material for forming a second lost model into said first mold to form a second lost model, coating a refractory material over said second lost model to form a second mold for casting, removing said second lost model to form a cavity, casting a molten metal




or alloy into said cavity, and staving said second mold to take out a finished product.

13. A process for producing a hollow metal cast product comprising the steps of preparing a first lost model having an outer contour substantially corresponding to a desired interior contour of the finished product, depositing a metal and a ceramic material over the surface of said first lost model by spraying to form a composite layer defining a hollow core block, placing said hollow core block in a first mold, pouring or injecting a material for forming a second lost model into said first mold to form a second lost model, coating a refractory material over said second lost model to form a second mold for casting, removing said second lost model to form a cavity, casting a molten metal or alloy into said cavity, and staving said second mold to take out a finished product.

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**4,712,606**

## SOLAR ENERGY STORAGE CELL

**Richard A. Menelly, 87 Belden Rd., Burlington, Conn. 06013**

**Division of Ser. No. 652,271, Sep. 20, 1984, Pat. No. 4,597,434.**
**This application Apr. 2, 1986, Ser. No. 847,198**
**Int. Cl.[4] F28D *21/00***
**U.S. Cl. 165—1** **8 Claims**

1. A method of storing thermal energy comprising the steps of:
providing a first material having a first heat of adsorption within a container, said first material being saturated with a liquid at a first temperature;
exposing said container and said first material to a source of heat to increase the temperature of said first material to a second temperature in excess of said first temperature but less than the boiling point of said liquid to release some of said liquid from said first material to within said container; and
adsorbing said released liquid from within said container

when the temperature of said first material decreases to a third temperature lower than said second temperature to

cause said first material to release heat as heat of adsorption.

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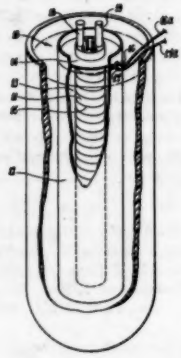
4,712,607

## CRYOSYSTEM FOR BIOLOGICAL MATERIAL

Willem Lindemans, and Lauri J. Aaltonen, both of Victoria, Australia, assignors to Freeze Control Pty. Ltd., Victoria, Australia

Filed Nov. 8, 1985, Ser. No. 796,328
Claims priority, application Australia, Nov. 9, 1984, PG8048
Int. Cl.[4] F25B 29/00, 19/00
U.S. Cl. 165—30 15 Claims



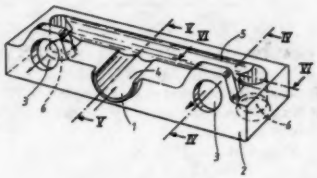
1. A cyro-cell assembly for freezing/thawing biological material, said assembly including a core member having a substantially circular cross-section, a plurality of spaces formed in said core member for receiving said biological material, said core member being adapted for conducting heat from said spaces to a cryogenic heat sink, said assembly including heat generating means in heat conducting relationship with said spaces and said spaces being arranged such that they intercept common isotherms which lie substantially along concentric cylindrical surfaces.

4,712,608

## HEAT EXCHANGER FOR THE INDEPENDENT HEATING OF THE DRIVER AND FRONT-SEAT PASSENGER SIDE OF A MOTOR VEHICLE

Klaus Arold, Sindelfingen, Fed. Rep. of Germany; Hermann Grimm, deceased, late of Ostelsheim, Fed. Rep. of Germany (by Christel Grimm, executrix), and Heinz Koukal, Sindelfingen, Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Feb. 7, 1986, Ser. No. 827,287
Claims priority, application Fed. Rep. of Germany, Feb. 7, 1985, 3504129
Int. Cl.[4] F28F 1/10; F28D 7/00
U.S. Cl. 165—41 26 Claims




1. An upper heat exchanger header for a heat exchanger for independent heating of the driver and front passenger side of a passenger space of a motor vehicle, said heat exchanger being of the type having a pair of ribbed block units, each including inlet flow pipes and return flow pipes extending therethrough between an upper heat exchanger header and a lower heat exchanger header, said upper heat exchanger header comprising:

centrally disposed inlet flow connection means for accommodating inflow of heating medium means,

transverse channel means extending across a substantial portion of the lateral width of the upper heat exchanger header and being configured to connect the inlet flow connection means with respective inlet flow pipe openings opening into the respective lateral outward portions of the upper heat exchanger header, and

return flow collection chamber means extending substantially across the width of the upper heat exchanger header and between the respective inlet flow openings for accommodating return flow from return flow pipes of the respective ribbed block units communicating therewith,

whereby the inlet flow of the heating medium is passed from the upper heat exchanger header downwardly through the ribbed block units at positions laterally outwardly of the location of return flow pipes in the ribbed block unit thereby optimizing heat stratification in the heat exchanger.

14. A heat exchanger for independent heating of the driver and front passenger side of a passenger space of a motor vehicle, comprising:

an upper heat exchanger header,

a lower heat exchanger header, and

a pair of ribbed block units which each include inlet flow pipes and return flow pipes extending between the upper and lower headers,

wherein said upper heat exchanger header comprises:

centrally disposed inlet flow connection means for accommodating inflow of heating medium means,

transverse channel means extending across a substantial portion of the lateral width of the upper heat exchanger header and being configured to connect the inlet flow connection means with respective inlet flow pipe openings opening into the respective lateral outward portions of the upper heat exchanger header, and

return flow collection chamber means extending substantially across the width of the upper heat exchanger header and between the respective inlet flow openings for accommodating return flow from return flow pipes

of the respective ribbed block units communicating therewith,

whereby the inlet flow of the heating medium is passed from the upper heat exchanger header downwardly through the ribbed block units at positions laterally outwardly of the location of return flow pipes in the ribbed block unit thereby optimizing heat stratification in the heat exchanger.

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**4,712,609**

## HEAT SINK STRUCTURE

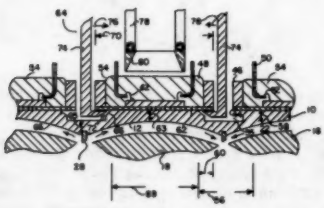
**Arthur H. Iversen, 15315 Sobey Rd., Saratoga, Calif. 95070**

**Continuation-in-part of Ser. No. 673,839, Nov. 21, 1984, abandoned. This application Feb. 7, 1985, Ser. No. 699,429**

**The portion of the term of this patent subsequent to Jun. 19, 2001, has been disclaimed.**

**Int. Cl.⁴ F28F *3/06*; H01L *23/36***

**U.S. Cl. 165—80.4** **31 Claims**



6. A semi-conductor heat sink structure including a planar surface suitable for bonding one or more semi-conductor devices in intimate thermal relationship thereto, and including a heat exchange surface on the interior surface thereof, said structure providing means for enclosing said heat exchange surface in a liquid tight manner and including means for providing a flow of coolant liquid to remove heat from said heat exchange surface by formation of nucleate vapor bubbles on said heat exchange surface, said heat exchange surface further includes one or more adjacent periodic curves across substantially the width of said structure and extending substantially the length of said structure and wherein a liquid coolant diverter is structured in the heat exchange region to provide predetermined liquid flow conditions in the proximity of said heat exchange surface, the improvement wherein said surface for bonding semi-conductor devices includes:

channels of predetermined depth and width adjacent to at least two sides of said semi-conductor device and underlying, to a pre-determined distance, said semi-conductor device wherein a semi-conductor device removal tool may be inserted to provide a force for the removal of said semi-conductor device.

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**4,712,610**

## CHEMICAL HEAT PIPE EMPLOYING SELF-DRIVEN CHEMICAL PUMP BASED ON A MOLAR INCREASE

**Arthur S. Kesten, West Hartford; Alan F. Haught, Glastonbury, and Harold T. Couch, Simbury, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Nov. 28, 1986, Ser. No. 936,048**

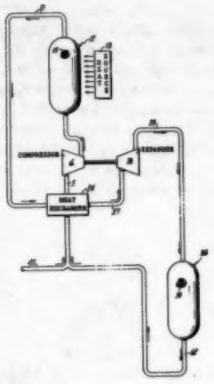
**Int. Cl.⁴ F28D *21/00***

**U.S. Cl. 165—104.12** **4 Claims**

1. In a chemical heat pipe employing reversible endothermic/exothermic chemical reactions to transfer thermal energy between a heat source and a heat sink the method of self-driving at least one reactant substantially unidirectionally through said heat pipe comprising:

(a) compressing said reactant(s) with a compressor and heating said reactant(s) to a predetermined pressure and temperature sufficient to endothermically react said reactant(s) to form reaction product having at least a 150% molar increase thereby establishing said self-driving unidirectional flow;

(b) transferring heat from said reaction product to said reactants; and



(c) expanding said reaction product with an expander linked mechanically to said compressor whereby said expansion energy is sufficient to compress said reactants to said predetermined pressure while maintaining said self-driving unidirectional flow.

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**4,712,611**

## HEATING OR AIR-CONDITIONING VENTILATION UNIT FOR MOTOR VEHICLES

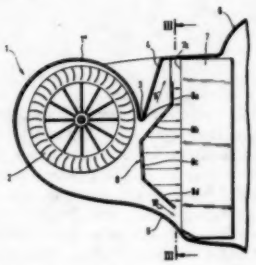
**Karlheinz Witzel, Stuttgart, Fed. Rep. of Germany, assignor to Sueddeutsche Kuehlerfabrik Julius Fr. Behr GmbH & Co. KG, Stuttgart, Fed. Rep. of Germany**

**Filed May 28, 1986, Ser. No. 867,511**

**Claims priority, application Fed. Rep. of Germany, Jun. 7, 1985, 3520548**

**Int. Cl.⁴ F28F *13/12***

**U.S. Cl. 165—122** **21 Claims**



1. A heating or air-conditioning ventilation unit for a motor vehicle, comprising:

a radial blower disposed in a first housing and having a generally rectangular outlet opening of a first size;

a second housing closely adjacent to said first housing and having a cross-sectional size substantially larger than the size of said outlet opening;

a diffuser defined by upper and lower wall parts connecting said first housing and said second housing, wherein said upper and lower wall parts open from the size of said outlet opening to the cross-sectional size of said second housing with a wide opening angle;

a heat exchanger positioned in said second housing in close

proximity to said diffuser and having a rear surface which faces said diffuser and which substantially fills the cross-section of said second housing; and

means for providing a uniform admission of air to said heat exchanger, said means comprising a grid comprised of portions of substantially equal thickness wherein the thickness is small in comparison to the area of the grid, said grid being positioned between said diffuser and said heat exchanger and having a generally convex profile, with a portion of said profile of said grid extending into said diffuser, wherein said grid extends over about 60% to 80% of the end face of said heat exchanger and wherein the ratio of the open area to the total area of said grid is from about 0.6:1 to about 0.8:1.

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**4,712,612**

## HORIZONTAL STACK TYPE EVAPORATOR

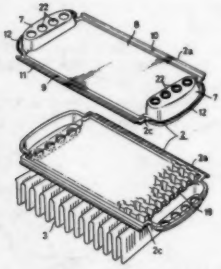
**Masayoshi Okamoto, Oyamashi; Katsuhisa Suzuki, Utsunomiyashi; Ryoichi Hoshino, Oyamashi, and Hironaka Sasaki, Shimodateshi, all of Japan, assignors to Showa Aluminum Kabushiki Kaisha, Osaka, Japan**

**Filed Oct. 7, 1985, Ser. No. 785,279**

**Claims priority, application Japan, Oct. 12, 1984, 59-214981; Jun. 21, 1985, 60-136573**

**Int. Cl.[4] F28F *13/00*; F28D *1/02***

**U.S. Cl. 165—146** **1 Claim**



1. A horizontal stack type evaporator comprising:

a core portion having an inlet disposed at a lower part thereof and an outlet disposed at an upper part thereof;

a fluid path for allowing a cooling fluid to pass through the core from the lower part to the upper part thereof, the path being a zigzag form so that the fluid passes through the core portion at least three times and comprises a stack which includes a plurality of planar tubular elements and corrugated fins alternately overlaid into a stack form, the tubular elements each having bulged sections at their opposite ends;

flat tubings forming said tubular elements and communicating with the bulged sections, each flat tubing being formed by two molded plates joined along their periphery, each plate including a trough along the periphery formed by bending the periphery of the molded plate;

multi-entry type inner fins arranged in said flat tubings and having a fin pitch ranging from 3.0 to 6.0 mm;

each flow direction of the fluid passing through the core is comprised of a plurality of flat tubings so that a plurality of unit paths result; and

the fluid path through the core has an increasingly large cross-sectional area from inlet to outlet.

**4,712,613**

## DOWN-HOLE BLOW-OUT PREVENTERS

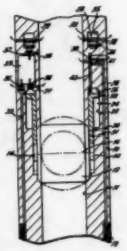
**Ronald L. Nieuwstad, Stavanger, Norway, assignor to Peder Smedvig Aksjeselskap, Stavanger, Norway**

**Filed Jun. 10, 1986, Ser. No. 872,276**

**Claims priority, application United Kingdom, Jun. 12, 1985, 8514887**

**Int. Cl.[4] E21B *34/06***

**U.S. Cl. 166—53** **17 Claims**



1. A down-hole blow-out preventer of the kind having means for connection into a drill string for use therewith in a bore hole, said blow-out preventer comprising:

a housing formed with a bore extending through said housing for the passage therethrough of drilling fluid;

means for connecting said housing into a drill string so that the bore of the housing communicates with the bore of the drill string;

packer means inflatable into engagement with the bore hole to form an annular seal between said bore hole and the housing;

and bore closure means for closing off the bore of the housing, said bore closure means including a bore closure member movably mounted in the bore of the housing, a piston mounted for movement in a cylinder in the housing, said piston being operatively connected to said bore closure means and being movable between a first position in which the bore of the housing is open and a second position in which the bore closure means closes off the bore of the housing, means for communicating said cylinder on one side of the piston with the bore of the housing, said cylinder on the other side of the piston defining a chamber which contains a compressible fluid, and first valve means normally isolating said communicating means and operable by a signal to open said communicating means to expose said piston to said fluid pressure in the bore of the housing to cause the piston to move to its second position to close off the bore of the housing.

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**4,712,614**

## LINER HANGER ASSEMBLY WITH COMBINATION SETTING TOOL

**Roger P. Allwin, College Station, and Mark P. Budke, Bryan, both of Tex., assignors to Lindsey Completion Systems, Midland, Tex.**

**Filed Aug. 29, 1986, Ser. No. 901,835**

**Int. Cl.[4] E21B *23/00***

**U.S. Cl. 166—208** **28 Claims**

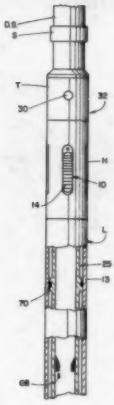
1. A setting tool and liner hanger for setting a liner in a well bore traversing earth formation which include:

a tubular outer member adapted for coupling to a liner, said outer member having slip means circumferentially disposed about said outer member and arranged for movement between a contracted unset position within the circumference of the outer surface of the outer member and an extended setting position where the slip means engage the wall of a well bore;

a setting tool having a tubular inner member arranged for coupling to a drill or work string,

interconnecting means for releasably interconnecting said inner member and said outer member,

hydraulic-mechanical actuator means carried by said inner member and having a hydraulic cylinder movable between contracted and expanded positions, spring means cooperating with said cylinder for providing a mechanical force, said cylinder having access to the bore of said inner member for the application of hydraulic pressure;



slip actuator means for moving said slip means in response to operation of said hydraulic-mechanical actuator means,

release means for releasably retaining said actuator means in a contracted position on said inner member, said release means being operable in response to hydraulic pressure to said cylinder or operable in response to relative rotation between said tubular inner member and said slip actuator means to release said mechanical force.

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**4,712,615**

**LINER HANGER ASSEMBLY WITH SETTING TOOL**

**Roy R. Dockins, Jr., Orange, Calif., and Hiram E. Lindsey, Jr., Midland, Tex., assignors to Lindsey Completion Systems, Midland, Tex.**

**Filed Jul. 1, 1986, Ser. No. 881,053**
**Int. Cl.[4] E21B *23/00, 43/10***
**U.S. Cl. 166—208** **17 Claims**

1. A setting tool and liner hanger for setting a liner in a well bore traversing earth formations including:

a tubular outer hanger member adapted for coupling to a depending liner,

said outer hanger member having circumferentially disposed elongated slip openings,

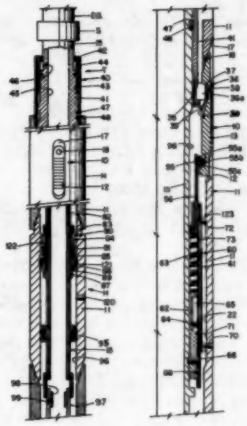
elongated slip members disposed in said slip openings for movement of said slip members from a first retracted position within the outer hanger member to an extended position in engagement with the wall of a well casing,

a setting tool having a tubular inner member adapted for coupling to a drill string; hydraulic slip setting means for response to hydraulic pressure for producing a slip setting force and mechanical slip setting means for producing a slip setting force, said hydraulic slip setting means and said mechanical slip setting means being carried by said tubular inner member;

coupling means for releasably coupling said tubular inner member to said outer hanger member;

said slip setting means including an upper dog member and a lower dog member which are respectively connected to said hydraulic slip setting means and to said mechanical slip setting means wherein said dog members are movable longitudinally relative to said tubular inner member in response to a slip setting force for moving said slip members from said first retracted postition to said extended position,

said hydraulic slip setting means and said mechanical slip setting means for moving said upper and lower dog members respectively including selectively operable actuator means for selectively moving one of said dog members longitudinally relative to said tubular inner member and said outer hanger member.



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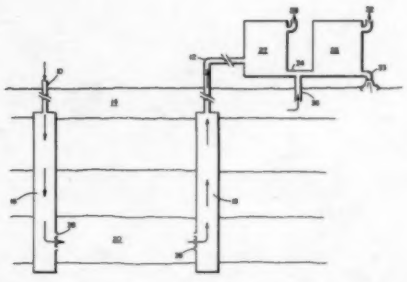
**4,712,616**

**METHOD FOR SCALE REDUCTION IN OFF-SHORE PLATFORMS**

**D. M. Ehlers, Addison, and Daniel N. Hopkins, Dallas, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed Sep. 11, 1986, Ser. No. 906,112**
**Int. Cl.[4] E21B *41/02, 43/34***
**U.S. Cl. 166—266** **8 Claims**



1. A process for reducing scale formation wherein sea water, incompatible with connate water, is used as the flooding medium forming thereby a mixture with liquid hydrocarbonaceous fluids where said fluids are produced in off-shore platforms comprising:

(a) producing said mixture of water and liquid hydrocarbonaceous fluids to the surface from said formation;

(b) directing said mixture into a water/oil separator where said liquid hydrocarbonaceous fluids are substantially separated from said mixture and the remaining hydrocarbonaceous fluid is entrained in the form of oil droplets within the separated aqueous mixture;

(c) removing said aqueous mixture with oil droplets therein from said water/oil separator and thereafter mixing the

combination with additional sea water, or other aqueous solution having a similar concentration of sulfate ions, in a vessel containing a coalescing means which sea water upon contact with said connate water causes a precipitate to form thereby reducing the scale forming tendency of the water; and

(d) collecting liquid hydrocarbons from step (b) and from said coalescing means, and disposing of the resultant water.

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**4,712,617**

**METHOD FOR CONTROLLING THE FLOW OF LIQUIDS THROUGH A SUBTERRANEAN FORMATION**

**Deborah L. Kocsis, Newark, Ohio, assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Oct. 3, 1986, Ser. No. 914,959**

**Int. Cl.[4] E21B *33/138, 43/20***

**U.S. Cl. 166—270** **18 Claims**

9. An improved method for the enhanced oil recovery of a hydrocarbon from a subterranean formation, the enhanced oil recovery method comprising injecting an aqueous drive fluid through an injection wellbore into a hydrocarbon-bearing formation to drive the hydrocarbon from the formation to a producing wellbore wherein the improvement in the method comprises introducing, through the injection wellbore, into the formation, a water-soluble carboxamide polymer and a hypohalite salt cross-linking agent in amounts and at conditions such that the polymer is or has been cross-linked to form a gel, thereby restricting the passage of the drive fluid through the more permeable zones of the formation.

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**4,712,618**

**MULTIPLE RESERVOIR TRANSPORTATION ASSEMBLY FOR RADIOACTIVE SUBSTANCES, AND RELATED METHOD**

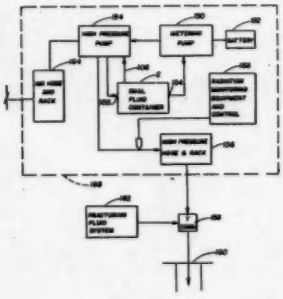
**Wayne A. Handke, and Mark A. Priest, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.**

**Division of Ser. No. 823,885, Jan. 29, 1986, Pat. No. 4,698,510.**

**This application Jan. 16, 1987, Ser. No. 4,001**

**Int. Cl.[4] E21B *43/26, 49/00***

**U.S. Cl. 166—308** **4 Claims**



1. A method of injecting a radioactive substance into a well, comprising the steps of:

transferring the radioactive substance into a first cavity of a single radioactivity shielding container;

transferring a diluting substance into a second cavity of the container;

moving the container to the well;

flowing the radioactive substance from the first cavity;

flowing the diluting substance from the second cavity into the flowing radioactive substance for mixing therewith;

flowing at least a portion of the mixed radioactive substance and diluting substance into the well; and

flowing any remaining portion of the mixed radioactive substance and diluting substance into the second cavity of the container.

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**4,712,619**

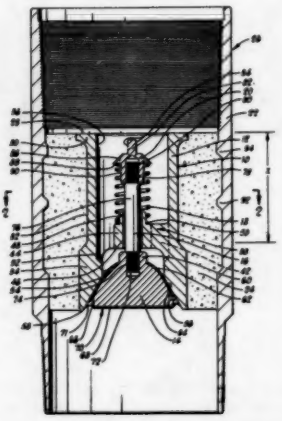
**POPPET VALVE**

**Lee W. Stepp, Comanche, and Richard L. Giroux, Duncan, both of Okla., assignors to Halliburton Company, Duncan, Okla.**

**Filed Jul. 30, 1986, Ser. No. 892,004**

**Int. Cl.[4] F21B *34/08*; F16K *15/00***

**U.S. Cl. 166—327** **3 Claims**



1. A float device for use in a well bore cementing operation, said float device comprising:

a casing equipment housing including a tubular section having an axial bore therethrough;

a valve assembly axially disposed in said tubular section axial bore of said casing equipment housing, said valve assembly including:

a unitary tubular valve body having a radially extending flange at the top exterior thereof defining a plug seat, a valve seat base therebelow and a cylindrical surface of lesser diameter than said flange and said valve seat base and extending therebetween and an axial bore extending therethrough with a downwardly-facing valve seat therein adjacent said valve seat base, said valve seat having a generally frustoconical configuration;

a guide spider above said valve seat comprising a plurality of radially oriented legs extending inwardly from the wall of said axial bore of said unitary tubular valve body to a central cylindrical collar having an axial stem bolt bore therethrough and a shoulder having, in turn, an upset extending upwardly therefrom;

a valve poppet having an upwardly-facing valve surface of frustoconical configuration thereon disposed adjacent said valve seat sealingly engaging the generally frustoconical configuration thereof and having an elastomeric sheath over the frustoconical configuration of said upwardly-facing valve surface, said elastomeric sheath including a circumferentially-extending lip at the lower periphery thereof;

a stem bolt secured to said valve poppet and extending upwardly through said stem bolt bore in said collar;

a spring retention cap at the top of said stem bolt, said spring retention cap including an outwardly extending flange thereon and a lower cylindrical section of lesser diameter than said flange; and

a coil spring disposed about said stem bolt above said collar, said coil spring being supported on said annular spring shoulder on said guide spider being centered thereon by said upset extending upwardly from said

shoulder into said spring and extending over said cylindrical section on said spring retention cap abutting the outwardly extending flange thereon; and

a cement sheath surrounding said valve assembly and substantially filling the annular void between said valve assembly and the wall of said tubular section bore of said casing equipment housing, said cement sheath having a top surface substantially flush with said plug seat on said valve body.

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**4,712,620**

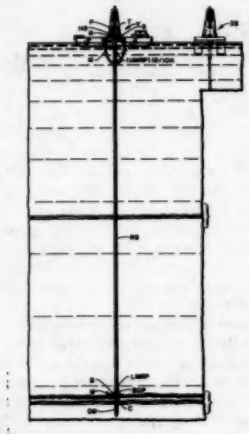
**UPPER MARINE RISER PACKAGE**

**Jack S. Lim, Ventura, and Darrell L. Jones, Ojai, both of Calif., assignors to Vetco Gray Inc., Houston, Tex.**

**Filed Jan. 31, 1985, Ser. No. 696,823**

**Int. Cl.[4] E21B *17/01, 33/035***

**U.S. Cl. 166—355** **51 Claims**



1. An upper marine riser package, operable from a relatively moveable structure, such as on a floating vessel which is subject to movement by wave action and the like, and adapted to be connected and lowered through a confined opening such as a rotary table in the vessel and supportable on a diverter housing on the vessel, said package comprising:

a diverter for diverting drilling fluid and gas from a subsea, well,

a tilting means connected to said diverter to allow tilting movement between said diverter, diverter housing, vessel and the remainder of said package,

a slip joint with riser tensioning means forming part thereof connected to said tilting means to compensate for vertical movement between said well and said vessel,

said slip joint comprising an inner barrel and an outer barrel, the inner barrel being sized to telescope within said outer barrel and further including means supporting said inner barrel with respect to said diverter housing, and a plurality of cylinder assemblies connected to said support means and to said outer barrel and subject to said fluid pressure within said cylinder assemblies to compensate for vertical motion of said vessel, and

a rotation bearing connected to part of said slip joint to allow rotational movement between said well and said part,

said package being connectable to a string of risers and lowered through said confined opening and said diverter housing and to a source of air and fluid under pressure for operating said package.

32. A self-tensioning slip joint for supporting a load beneath a floating vessel and capable of being lowered through a rotating table on said vessel comprising:

an inner barrel,

an outer barrel of a size to telescope over said inner barrel,

means preventing relative rotation between said barrels,

a plurality of cylinder assemblies surrounding said barrels and actuatable in parallel with the major axes of said barrels,

said cylinder assemblies each comprising an outer cylinder and a piston rod reciprocal in said cylinder with a piston attached thereto and with said outer cylinder defining a pressure chamber in said cylinder assembly,

means for communicating fluid pressure from a high pressure source to said chamber as operating fluid for urging said outer barrel toward a position fully telescoped with said inner barrel,

said piston rod being attached to a supporting means which moves to said floating vessel and said cylinder being attached to said outer barrel to compensate for the load.

50. In a self-tensioning slip joint comprising a pair of telescoping tubular members, one of which is connected for vertical movement to a subsea well and the other which is connected to a floating vessel and having seal means therebetween for slideable fluid tight interaction, the method of removing said sealing means from between said tubular members comprising the steps of;

causing said tubular members to be latched against movement therebetween, and

removing said sealing means axially of said cylindrical members.

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**4,712,621**

**CASING HANGER RUNNING TOOL**

**William D. Wightman, Houston, and Wilson L. Strahan, Magnolia, both of Tex., assignors to Hughes Tool Company, Houston, Tex.**

**Filed Dec. 17, 1986, Ser. No. 943,278**

**Int. Cl.[4] F21B *23/08***

**U.S. Cl. 166—382** **9 Claims**

1. A running tool adapted to be secured to the lower end of the string of drill pipe for running a string of casing into a well, landing a casing hanger on a shoulder in a wellhead, and setting a seal between the wellhead and the casing hanger, the running tool comprising in combination:

holder means carried by the running tool for holding the casing hanger as the casing hanger is lowered into the wellhead;

piston means, including a piston carried by the running tool above the seal, for setting the seal when supplied with hydraulic fluid pressure;

an axial passage extending through the running tool and joining a passage extending through the drill pipe;

actuating passage means in the running tool extending to the top of the piston for supplying liquid pumped down the drill pipe passage to the piston to move the piston downward to set the seal;

release passage means in the running tool extending to the holder means for supplying liquid pumped down the drill pipe passage to the holder means to release the running tool from the casing hanger after the seal has set;

means for blocking access from the running tool axial passage to the actuating passage means and release passage means while cement is pumped down the drill pipe and through the running tool to cement the casing;

means actuated from the surface for providing access from the running tool axial passage to the actuating passage means and blocking access to the release passage means to pump fluid from the drill pipe against the piston to set the seal after cementing; and

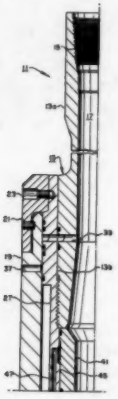
means actuated from the surface for providing access from the running tool axial passage to the release passage means and blocking access to the actuating passage means, to pump fluid from the drill pipe to the holder means to release the running tool from the holder means.

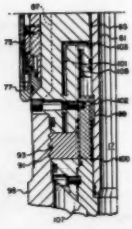
8. In a method of setting a string of casing in a well, including the steps of securing a running tool to a string of drill pipe,

and the running tool to a casing hanger mounted to the top of the string of casing, lowering the drill pipe into the well until the casing hanger seats on a wellhead, then pumping cement down the drill pipe and up an annulus around the casing, the improvement comprising:

after cementing, lowering the drill string a selected distance to open circulation ports provided in the running tool that lead between an axial passage of the running tool and an annulus surrounding the running tool;

pumping a plug down the drill pipe to move a sliding sleeve in the running tool downward to open an actuating pas-





sage leading to a piston in the running tool, and causing fluid in the drill pipe below the plug to return through the circulation ports as the plug is pumped down; then

pumping fluid down the drill pipe to push the piston down to set a seal located between the casing hanger and the wellhead;

lowering the drill pipe another selected distance to close the actuating passage in the running tool and open a release passage; then

pumping fluid from the drill pipe into the running tool and into the release passage to release the running tool from the casing hanger.

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**4,712,622**

**SELF-LEVELING AGRICULTURAL IMPLEMENT**

**Eugen J. Birkenbach, Kildeer; Brad K. Eversole, Bollingbrook, and Kevin J. Magee, Romeoville, all of Ill., assignors to J. I. Case Company, Racine, Wis.**

**Filed Apr. 24, 1986, Ser. No. 856,802**

**Int. Cl.[4] A01B** *63/111*

**U.S. Cl. 172—328** **3 Claims**

1. A self-leveling argricultural implement, comprising:

a frame;

a plurality of ground-working tools mounted on said frame;

a draft hitch pivotally connected to said frame at a forward portion thereof;

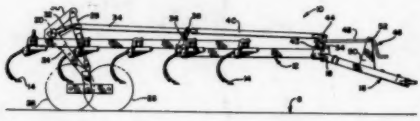
a rockshaft rotatably mounted on said frame and extending transversely thereof;

at least one wheel arm fixedly secured to said rockshaft;

at least one ground-engaging wheel rotatably mounted on a free end of said wheel arm;

hydraulic actuator means operatively connected with said rockshaft for selective rotation thereof, whereby said ground-engaging wheel is moved generally vertically relative to said frame for raising and lowering said frame relative to the ground for selectively varying the depth of penetration of said ground-working rools;

leveling linkage means operatively connected to said rockshaft and extending forwardly thereof in spaced relation above said frams, said leveling linkage means comprising a pair of first leveling links each operatively connected to said rockshaft and extending forwardly thereof in con-



verging relation each other, and further comprising a second leveling link operatively connected to forward ends of said first links and extending forwardly thereof,

idler arm means supporting said leveling linkage means above said frame for reciprocable movement of said linkage means, said idler arm means being arranged to substantially avoid stress-loading of said frame by said leveling linkage means; and

adjustment link means operatively connecting said draft hitch and said leveling linkage means, the forward end of said second link being operatively connected to said adjustment link means, said adjustment link means being adjustable to selectively pivot said draft hitch relative to said frame whereby said frame is in a level disposition when said draft hitch is connected to an associated tractor drawbar, said hitch thereafter being pivoted relative to said frame as said frame is raised and lowered by said hydraulic actuator means so that said frame is maintained in a level disposition.

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**4,712,623**

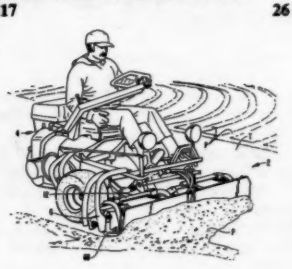
**TURF PLUG PUSHER**

**Donald G. Martinez, P.O. Box 584, Calistoga, Calif. 94515**

**Filed Mar. 17, 1986, Ser. No. 840,623**

**Int. Cl.[4] A01B** *45/00;* **E02F** *3/815*

**U.S. Cl. 172—817** **26 Claims**



1. A turf plug pusher for use with a vehicle to push aeration core plugs from a turf surface without damage to the turf surface comprising:

an elongate pusher element including a skid and barrier means;

the skid having a leading edge and a generally flat, horizontal turf engaging lower surface;

the pusher element being mounted to the vehicle so that the lower surface can rest on the turf surface during use;

the barrier means extending upwardly from the skid and including means for gathering core plugs on top of and in front of the skid as the pusher element moves in a forward direction over the turf surface so that the pusher element is self loading with the weight of core plugs tending to keep the lower surface of the skid plate against the turf surface.

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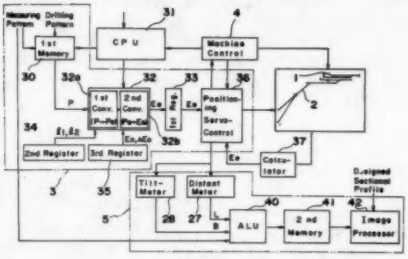
## 4,712,624
## ROCK DRILL WITH TUNNEL PROFILE CONTROL SYSTEM

**Toru Mashimo, Higashihiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan**

**Filed Sep. 3, 1986, Ser. No. 903,252**
**Claims priority, application Japan, Sep. 4, 1985, 60-196307**
**Int. Cl.[4] E21B *15/04***
**U.S. Cl. 173—43** **12 Claims**




1. A rock drill having a tunnel profile control system which comprises:

a boom means for the support of a rock drill thereon;

a converter means for converting the position of any one of a plurality of positioning points, projected on an orthogonal coordinate system representative of the transverse section of a tunnel to be driven, into a respective value on a boom coordinate system;

a positioning control means for positioning the boom means according to a value fed from the converter means;

an ultrasonic distance measuring means mounted on the boom means and including an ultrasonic generator-and-receiver for determining the distance between the position point and a point on the peripheral wall defining the tunnel; and

an arithmetic means which utilizes the distance determined by the ultrasonic distance measuring means, the direction of travel of ultrasonic waves generated and received by the ultrasonic generator-and-receiver and the value of the positioning point to calculate, in terms of a value in the orthogonal coordinate system, a value of a measuring point on the transverse section of the tunnel.

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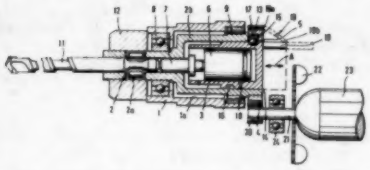
## 4,712,625
## DRILLING AND PERCUSSION HAMMER

**Willy Kress, Breitenwasen 21, D-7457 Bisingen, Fed. Rep. of Germany**

**Filed Jan. 14, 1986, Ser. No. 818,711**
**Int. Cl.[4] B23B *45/16***
**U.S. Cl. 173—104** **8 Claims**

1. A drilling or percussion hammer for use with an electric drive motor at least indirectly connected with a drive shaft having a tool holding fixture, said drive shaft comprising a hollow rotary sleeve, and a striking mechanism in driving relation therewith and having an axially reciprocating drive piston within said hollow sleeve for imparting its percussion energy to said tool holding fixture; characterized in that said rotatable sleeve is substantially stationary in the axial direction, and said striking mechanism includes a guide cam on the interior of said sleeve, and a peripherally extending, closed loop-shaped oblique guiding groove on said driving piston engaging said guide cam, whereby rotation of said sleeve effects axial movement of said drive piston.



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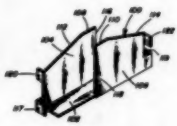
## 4,712,626
## RETAINER DEVICE FOR DRILL BIT

**Ray H. Shaw, Willowick, Ohio, assignor to Mining Tools, Inc. Div. of Smith California, Mentor, Ohio**

**Filed Apr. 2, 1981, Ser. No. 250,290**
**Int. Cl.[4] E21B *10/58, 10/62***
**U.S. Cl. 175—410** **13 Claims**



8. A drilling tool comprising: a body having a working end; prongs extending from said working end and forming a slot therebetween; a hard wear resistant insert; a braze fixture brazed to said prongs and to said insert; wherein said braze fixture comprises: a substantially flat base portion; a pair of arms extending substantially perpendicular to the plane of said base portion and on either side thereof; a first tab angularly extending from each of said arms and extending above and beyond its respective end of said base portion; said first tabs having oppositely facing abutment faces positioned so as to receive said insert between said abutment faces and keep said insert in a substantially fixed position; and a second tab extending downwardly from each respective end of said base portion with said second tabs having oppositely facing abutment faces, said abutment faces sliding over the outer dimension of said body and abutting against it so that said insert is now in a predetermined position with respect to said body.

11. A drilling tool comprising: a body having a working end; prongs extending from said working end and forming a slot therebetween; a hard wear resistant insert; a braze fixture brazed to said prongs and to said insert; wherein said braze fixture comprises: a substantially flat base portion; a pair of arms extending perpendicular to the plane of said base portion and on either side thereof; each arm having a first and a second tab angularly extending from the same end of said arm but in

opposite directions with respect to said base portion, said first tab extending inwardly above and beyond an end of said base portion, said second tab extending outwardly from said base portion, said first and second tabs having abutment faces facing in the same general direction; and wherein said insert is fixedly positioned between the respective first tab abutment faces and the respective second tab abutment faces abut the outer periphery of said prongs so that said insert is now in a predetermined position with respect to said prongs.

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4,712,627

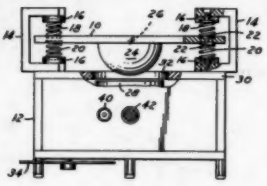
## CALIBRATION OF WEIGHT SCALE UTILIZING A CAPACITATIVE LOAD CELL

**Richard H. Harrington, and Charles W. Krapf, both of Ann Arbor, Mich., assignors to Measuretek, Inc., Saline, Mich.**

**Division of Ser. No. 784,858, Oct. 4, 1985, Pat. No. 4,629,019, which is a continuation-in-part of Ser. No. 642,123, Aug. 17, 1984, Pat. No. 4,585,082. This application Dec. 12, 1986, Ser. No. 941,052**

**Int. Cl.⁴ G01G *19/52*; G01L *25/00***

**U.S. Cl. 177—50** **6 Claims**



1. A method for two point calibration of a scale comprising the steps of:

weighing the empty platform, and reclaibrating the internal circuitry of the scale to zero the scale for the empty platform,

actuating the calibration means on the scale,

placing the scale upside down on its platform,

weighing the scale without the platform and comparing the weight to the original calibration weight of the scale without the platform,

recalibrating the internal circuitry of the scale to indicate the correct weight of the scale without the platform, and

righting the scale.

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4,712,628

## WEIGHING ELEMENT FOR A WEIGHING APPARATUS

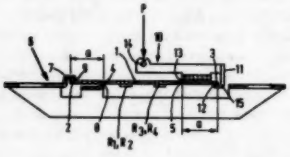
**Lippe Van den Brug, Groningen, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 728,721, Apr. 30, 1985. This application Jan. 6, 1987, Ser. No. 4,795**

**Claims priority, application Netherlands, May 4, 1984, 8401420**

**Int. Cl.⁴ G01G *3/14, 3/08*; G01L *1/22***

**U.S. Cl. 177—211** **6 Claims**



1. A weighing element for a weighing apparatus, said element comprising a frame; a bending element having one end and a top and bottom surface and strain-gauge transducers mounted thereon, said bending element having its top surface secured to said frame at said one end, said bending element having a free end; and a resilient force-transmitting arm with a first end secured to the bottom surface of said free end of said bending element, said bending element being made of a ceramic material and being supported on its bottom surface by said frame at a distance from said one end, the top surface of said bending element supporting said force-transmitting arm at a distance from said free end of said bending element; and pin means on said force-transmitting means through which forces are applied to said force transmitting arm, said pin means being located relative to the location of said supports for said bending element and said force-transmitting arm and said supports being located on the top and bottom of said bending element such that forces applied to said pin causes forces to be applied to said bending element at said supports which are opposite to the forces applied to said bending elements at its ends.

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4,712,629

## ENGINE AND DRIVE BELT COOLING SYSTEM FOR AN ALL TERRAIN VEHICLE

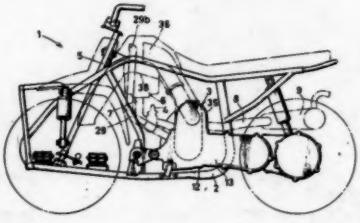
**Ken Takahashi, Hamamatsu; Chiaki Hirata, and Yuji Ishioka, both of Kosai, all of Japan, assignors to Suzuki Motor Company Limited, Japan**

**Filed Sep. 3, 1986, Ser. No. 903,279**

**Claims priority, application Japan, Sep. 4, 1985, 60-195475**

**Int. Cl.⁴ B60K *11/06*; F01P *1/02***

**U.S. Cl. 180—68.1** **3 Claims**



1. An all terrain vehicle having a belt driven type power transmission including a drive pulley means mounted securely on a crank shaft of an internal combustion engine of forced-air cooling type, an engine cooling fan means having an air intake suction side, said engine cooling fan means also being securely mounted on said crank shaft, a driven pulley means mounted on a driven shaft means, and a drive belt means extending operatively across said drive and driven pulley means; wherein said driven and driven pulley means and said drive belt means are enclosed hermetically within a casing means, comprising in combination an air suction fan means mounted integrally with said drive pulley means, a first suction duct means adapted to introduce outside air into the side of suction or negative pressure generated by said air suction fan means and connected operatively to said casing means, said casing means having an air outlet means located intermediate said drive pulley means and said driven pulley means, and a communicating pipe means operatively connecting said air outlet means to said suction side of said engine cooling fan means.

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4,712,630

## GROUND EFFECT VEHICLE

**Albert Blum, Scheiderhöhe, 5204 Lohmar 1, Fed. Rep. of Germany**

**Filed Jul. 17, 1985, Ser. No. 755,730**

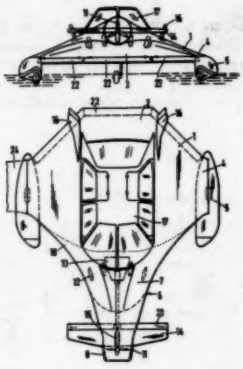
**Claims priority, application Fed. Rep. of Germany, Aug. 1, 1984, 3428281**

**Int. Cl.⁴ B60V *1/08, 1/14***

**U.S. Cl. 180—117** **19 Claims**

1. Ground effect vehicle with a central, wing-like support

body elongated along a longitudinal axis, at least one set of floats and undercarriage units located on both sides of the support body, a thrust generator supported on the support body and located in front of the support body and a nose of the vehicle, a control surface and a cabin located on top of the support body, for at least one person and for payloads, characterised in that the nose defines an airflow duct (7) under the support body (1), the airflow duct (7) being disposed between



the thrust generator (11) and the support body (1) at the bottom side of the nose (6), the airflow duct being formed by a roof-like guide profile (9) adjacent the support body (1) and the thrust generator (11) being sized to force a sufficient amount of airflow towards and directly under the entire support body along an axis parallel to the longitudinal axis to cause the propulsion and increase the aerodynamic lift of the vehicle, and that the thrust generator (11) is located under the front region of the nose (6) in the airflow duct (7).

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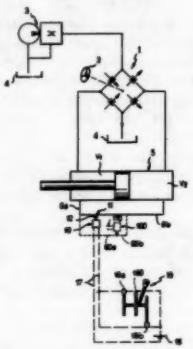
**4,712,631**

## ASSISTED STEERING SYSTEM FOR A MOTOR VEHICLE

**Gilbert Kervagoret, Argenteuil, France, assignor to Bendix France, Paris, France**

**Filed Mar. 26, 1986, Ser. No. 844,483**
**Claims priority, application France, Apr. 2, 1985, 85 04985**
**Int. Cl.[4] B62D 5/06, 5/09**
**U.S. Cl. 180—143** **4 Claims**



1. In a motor vehicle having a lever for a gear-changing mechanism, an assisted steering system comprising a hydraulic assistance actuator with two opposing chambers supplied selectively with fluid under pressure, the fluid coming from a source of pressure, through a distribution valve device, and valve means with electromagnetic control in a bridging circuit interconnecting the two opposing chambers of the hydraulic assistance actuator, the valve means connected to an electrical control circuit, the improvement consisting of the valve means with electromagnetic control having a valve seat between two ports in a control body interposed directly in the bridging circuit and that may be closed selectively by a ball valve associated with a plunger of an electromagnetic actuator, the valve seat forming a calibrated restriction in an insert secured to the control body in the bridging circuit, a mounting base of the electromagnetic actuator secured to the control body and having a seal thereabout, the ball valve member biased by the plunger and housed in a cavity defined between the seal and insert, the cavity forming part of the bridging circuit, the electrical control circuit including at least one switch actuable by the lever of the gear-changing mechanism and the switch actuating the electromagnetic actuator, the switch engageable by the lever and connected directly, by means of the electrical control circuit, to only the electromagnetic control and a power source.

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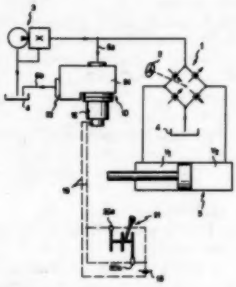
**4,712,632**

## ASSISTED STEERING SYSTEM FOR A MOTOR VEHICLE

**Gilbert Kervagoret, Argenteuil, France, assignor to Bendix France, Paris, France**

**Filed Mar. 26, 1986, Ser. No. 844,482**
**Claims priority, application France, Apr. 2, 1985, 85 04984**
**Int. Cl.[4] B62D 5/06, 5/09**
**U.S. Cl. 180—143** **5 Claims**



1. In a motor vehicle having a lever of a gear changing mechanism, an assisted steering system comprising a source of pressure, a reservoir, a distribution valve device comprising an inlet port connected to an outlet of the source of pressure, an outlet port connected to the reservoir, and at least one working port connected to a chamber of a hydraulic assistance actuator, and valve means with electromagnetic control interposed in a branch hydraulic line between the outlet of the source of pressure and the reservoir and connected to an electrical control circuit, the improvement consisting of the valve means with electromagnetic control comprising a fluid passage between an inlet port which communicates with the inlet port of the distribution valve device and an outlet port which communicates with the reservoir, the fluid passage including a valve seat which may be closed selectively by a ball valve member biased by a plunger of an electromagnetic actuator, the valve seat forming a calibrated restriction in a control body receiving a mounting base of the electromagnetic actuator and the inlet port of the fluid passage, the inlet port of the fluid passage adjacent a seal, the mounting base secured to the control body and having a seal thereabout, the ball valve member housed in a cavity located between the seals and forming part of the fluid passage, the electrical control circuit including at least one switch actuable by the lever of the gear changing mechanism in order to actuate the electromagnetic actuator, the switch engageable by the lever and connected directly, by means of the electrical control circuit, to only the electromagnetic control and a power source.

## 4,712,633
## MOTOR VEHICLE WITH HANDLEBAR

**Takahisa Suzuki, Saitama; Shinichi Kuwahara, Tokyo, and Yoshinori Kawashima, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 25, 1986, Ser. No. 899,984**
**Claims priority, application Japan, Aug. 23, 1985, 60-185110**
**Int. Cl.[4] B62D** *5/08*
**U.S. Cl. 180—149** **9 Claims**

1. A motor vehicle with a handlebar, comprising:
a vehicle frame assembly;
at least one front wheel rotatably supported on said vehicle frame assembly;
at least one rear wheel rotatably supported on said vehicle frame assembly;
an engine mounted on said vehicle frame assembly between said front and rear wheels;
a hydraulically operated power steering system operatively coupled to said handlebar, and
said hydraulically operated power steering system comprising:
a substantially cylindrical housing;
an input shaft rotatably supported in said housing and coupled to said handlebar;
an output shaft rotatably supported in said housing coaxially with said input shaft and operatively coupled to said front wheel; means for limiting the relative angular difference between said input and said output shafts;
a hydraulically actuated vane motor coupled to said output shaft for applying a torque to said output shaft; and
a control valve mechanism combined with said input and output shafts for controlling said vane motor based on a relative angular difference between said input and output shafts.

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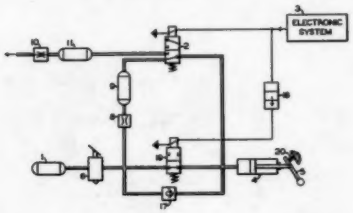
## 4,712,634
## CONTROL SYSTEM FOR A MOTOR VEHICLE ENGINE TO PREVENT SLIPPING OF THE VEHICLE DRIVE WHEELS DURING ACCELERATION

**Klaus Lindemann, Hanover, Fed. Rep. of Germany, assignor to Wabco Westinghouse Fahrzeugbremsen GmbH, Hanover, Fed. Rep. of Germany**

**Filed Dec. 5, 1986, Ser. No. 938,695**
**Claims priority, application Fed. Rep. of Germany, Dec. 14, 1985, 3544294**
**Int. Cl.[4] B60T** *8/04*
**U.S. Cl. 180—197** **6 Claims**

1. A wheel slip control system for regulating the power of a motor vehicle engine when a wheel slip condition of said vehicle arises upon acceleration thereof, comprising:
(a) an operator-controlled accelerator pedal;
(b) a fuel control lever;
(c) a mechanical linkage between said accelerator pedal and said fuel control lever via which said fuel control lever is operated in accordance with the selected position of said accelerator pedal to control the power produced by said motor vehicle engine;
(d) at least one wheel driven by said motor vehicle engine;
(e) means for sensing the driven rotational speed of said at least one wheel;
(f) evaluation means for detecting said wheel slip condition of said vehicle in response to the sensed rotational speed of said at least one wheel exceeding a predetermined threshold value;
(g) a fluid pressure actuator cylinder having a piston operatively connected in said mechanical linkage;
(h) first and second reservoirs normally charged with fluid under pressure;
(i) a first fluid flow restrictor via which fluid pressure communication is established between said first and second reservoirs; and




(j) a control valve having a supply port connected to one of said first and second reservoirs and an outlet connected to said actuator cylinder, said control valve being operated from a first position in which said supply port is cut off from said outlet to a second position in which said supply port is communicated with said outlet when said wheel slip condition is detected by said evaluation means, whereby said actuator cylinder is pressurized initially at a relatively fast rate and thence at a relatively slow rate to urge said piston in a direction to override said accelerator pedal control of said fuel control lever to accordingly effect a decrease of the power produced by said motor vehicle engine.

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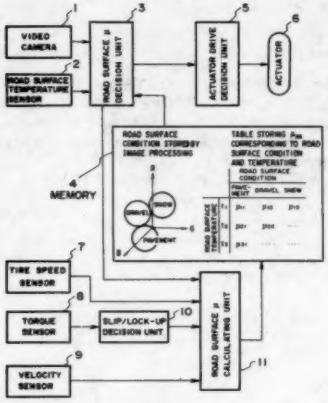
## 4,712,635
## CONTROL APPARATUS FOR FOUR-WHEEL DRIVE VEHICLE

**Koji Sumiya, Tokyo, and Shuzo Moroto, Handa, both of Japan, assignors to Aisin-Warner Kabushiki Kaisha, Anjo and Kabushiki Kaisha Shinsangyokaihatsu, Tokyo, both of, Japan**

**Filed Dec. 29, 1986, Ser. No. 947,225**
**Claims priority, application Japan, Jan. 13, 1986, 61-4820**
**Int. Cl.[4] B60T** *8/10*
**U.S. Cl. 180—197** **3 Claims**

1. A control apparatus for a four-wheel drive vehicle having an actuator for controlling changeover between two- and four-wheel drive or locking of a center differential mechanism, comprising:
pick-up means mounted on the vehicle for picking up an image of a road surface lying ahead of the vehicle;
memory means for storing a coefficient of friction of the road surface corresponding to an output signal from said pick-up means;
decision means for judging the coefficient of friction of the road surface by comparing data stored in said memory means and the output signal from said pick-up means;
driving decision means for driving the actuator in response to an output signal from said decision means; and
torque sensing means arranged on front and/or rear wheels of the vehicle for sensing the torque of the front and/or rear wheels;
wherein if it is judged by said torque sensing means that tire skidding or lock-up has occurred, the coefficient of fric-

tion of the road surface is calculated in response to an output signal from the torque sensing means and the coefficient of the road surface stored in said memory means is revised.

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**4,712,636**

## CARRIAGE FOR WATERCRAFT

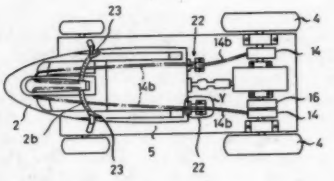
**Tsutomu Ishimatsu, Akashi, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Japan**

**Filed May 29, 1986, Ser. No. 868,069**

**Claims priority, application Japan, May 29, 1985, 60-117535**

**Int. Cl.[4] B60P *3/10*; B60K *25/06***

**U.S. Cl. 180—198** **2 Claims**



1. A carriage for transporting a watercraft on land, comprising: a dolly carrying a watercraft having an inboard prime mover and a power take-off means from that inboard prime mover; said dolly having plural wheels including driving wheels, rotatably supported by shafts on said dolly;

an input shaft connected to said power take-off means to transmit the prime mover's power in the form of torque;

power transmission means fixed on said dolly to transmit torque from said input shaft to said driving wheels,

said torque propelling the carriage by being transmitted via said power transmission means from said power take-off means of the watercraft loaded on said dolly to said driving wheels; and

means for steering said carriage when said carriage is being propelled, said steering means including:

manual lever means movably mounted on the watercraft;

a steering means mounted on the carriage; and

an interlocking means between said manual lever means and said steering means on the carriage for transmitting movement of said watercraft mounted lever means to said steering means to guide the carriage, said manual lever means includes a steering handle bar on the watercraft and levers located on both sides of said steering handle bar on the watercraft and wherein said steering means on the carriage includes clutches on said carriage for controlling the driving wheels, and said interlocking means includes means for transmitting the movement of said manual lever means to said clutches respectively for engaging/disengaging said clutches.

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**4,712,637**

## STRADDLE TYPE VEHICLE SEAT ASSEMBLY

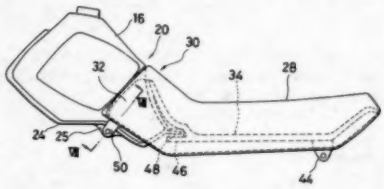
**Tomonori Mogi, and Yoshiaki Kashio, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 20, 1986, Ser. No. 876,973**

**Claims priority, application Japan, Jun. 20, 1985, 60-092228; Jun. 20, 1985, 60-092229**

**Int. Cl.[4] B62K *11/04, 19/30***

**U.S. Cl. 180—219** **6 Claims**



1. A saddle type seat assembly for a vehicle having a fuel tank, comprising:

downwardly projecting attachment members including fastening holes affixed to either side of the rear portion of the fuel tank;

a seat frame having the U-shaped cross section;

a forward portion of said seat frame extending over a rearward portion of the fuel tank to said attachment members;

engagement means affixed to said frame for engaging said attachment members; and

bolts extending through said fastening holes to engage said engagement means.

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**4,712,638**

## SUSPENSION SYSTEM FOR MOTORCYCLES

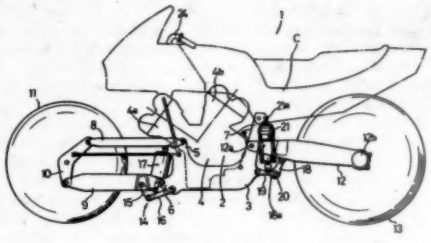
**Takeshi Kawaguchi, and Akio Kawano, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 25, 1986, Ser. No. 878,414**

**Claims priority, application Japan, Jun. 25, 1985, 60-138186; Jun. 25, 1985, 60-138184**

**Int. Cl.[4] B62K *25/16***

**U.S. Cl. 180—219** **4 Claims**



1. A suspension system for a motorcycle having front and rear wheels and a frame structure including a power unit as a structural part thereof, comprising:

generally horizontally disposed forwardly extending vertically spaced upper and lower front swing arms pivotally mounted at their proximal ends to said frame structure,

a steering plate extending between and pivotally connecting the distal ends of said upper and lower front swing arms,
means in said steering plate intermediate the ends thereof for rotably mounting said front wheel,
a cushion member pivotally mounted at one end to said frame structure, and
means for connecting the other end of said cushion member to said lower front swing arm, including:
a generally L-shaped cushion arm pivotally connected at one end to said cushion member and at the other end to said lower front swing arm, and
a connecting rod extending substantially parallel to said lower swing arm and having one end pivotally connected to said frame structure and its other end pivotally connected to said cushion arm intermediate the ends thereof.

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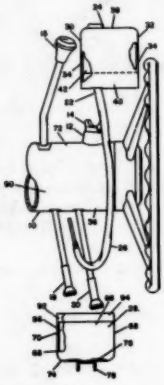
**4,712,639**

## AUTOMOBILE ANTI-THEFT DEVICE

**Joseph E. Solow, Plainview, N.Y., assignor to Wolo Manufacturing Corp., Deer Park, N.Y.**

**Filed Feb. 11, 1987, Ser. No. 13,392**
**Int. Cl.[4] E05B *17/14***
**U.S. Cl. 180—287** **4 Claims**



1. An automobile anti-theft device for protecting a steering column ignition lock, comprising:
a first cover having a hollow interior space and being open on one side, the open side having arcuate surfaces spacing opposite ends of said first cover, thereby being adapted to fit over a portion of a steering column containing an ignition lock;
a tension bearing element;
means for attaching one end of said element to one end of said first cover to permit the remaining portion to wrap around the steering column and a second cover;
means for releasably attaching said element to the other end of said first cover;
a second cover having opposed end walls with arcuate edges adapted to wrap around a portion of the steering column, a top wall arranged perpendicular to said opposed edges at the edges away from said arcuate edges, with at least one opening permitting a turn signal lever to be received by said second cover, opposed side walls, adapted to fit along a portion of the steering column, and an open bottom, wherein said second cover has a hollow interior adapted to fit over a turn signal housing; and
constraining means on the second cover top wall for receiving said tension bearing for constraining said tension bearing element against lateral movement, whereby said first cover may be placed over a steering column ignition lock, said second cover may be fitted over the turn signal housing, and said tension bearing element can be wrapped around the steering column, engaging said constraining means, and attached to the other end of the cover for retaining said first and second covers against the steering column.

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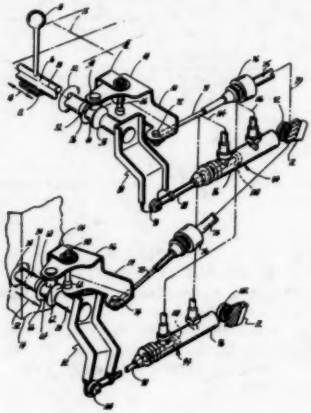
**4,712,640**

## HYDRAULIC REMOTE CONTROL FOR MOTOR VEHICLE MANUAL SHIFT TRANSMISSION

**Keith V. Leigh-Monstevens, Troy, and David K. Mienko, Clawson, both of Mich., assignors to Automotive Products plc, Warwickshire, England**

**Filed Dec. 20, 1985, Ser. No. 811,344**
**Int. Cl.[4] B60K *20/14***
**U.S. Cl. 180—336** **15 Claims**



1. A gear select and shift mechanism for a motor vehicle having a transmission having a housing and including a select and shift rail having an operating portion positioned within said housing and an access portion positioned outside of said housing, said rail being axially movable for selection of a couple of gear ratios and being rotatably movable in opposite directions for shifting into a gear ratio, said mechanism comprising a manually operable shift lever located remotely from said transmission and motion transmitting means between said shift lever and said shift rail for axially displacing said shift rail and for rotating said shift rail in response to pivoting motion of said shift lever, said motion transmitting means for rotating said shift rail comprising a hydraulic master cylinder having a linearly displaceable input member connected to said shift lever for operating said input member by pivoting motion of said shift lever, a slave cylinder having a linearly displaceable output member connected to said access portion of said shift rail for rotating said shift rail in one of two opposite directions in response to linear displacement of said output member, and hydraulic link means interconnecting said master cylinder and said slave cylinder and operative to direct the hydraulic fluid discharged from said master cylinder in response to linear displacement of said input member to said slave cylinder and operative to direct the hydraulic fluid discharged from said slave cylinder in response to linear displacement of said output member to said master cylinder so that linear movement of said input member of said master cylinder produces corresponding linear movement of said output member of said slave cylinder so that pivoting movement of said shift lever produces rotation of said shift rail, said motion transmitting means for axially displacing said shift rail comprising a bracket adapted to be secured to said transmission housing proximate said shift rail, a first lever pivotally mounted on said bracket and engaging said shift rail access portion, and means operative in response to

axial displacement of said shift lever to pivot said first lever on said bracket and axially displace said shift rail.

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**4,712,641**

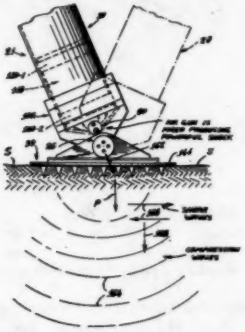
## METHOD AND SYSTEM FOR GENERATING SHEAR WAVES AND COMPRESSION WAVES IN THE EARTH FOR SEISMIC SURVEYING

**Stephen V. Chelminski, West Redding, Conn., assignor to Bolt Technology Corporation, Norwalk, Conn.**

**Continuation-in-part of Ser. No. 590,723, Mar. 19, 1984, abandoned. This application Sep. 21, 1984, Ser. No. 653,438**

**Int. Cl.[4] G01V** *1/04, 1/02, 1/00;* **H04R** *1/02*

**U.S. Cl. 181—113** **58 Claims**



1. Apparatus for generating horizontally polarized shear waves and compression waves in the earth for seismic surveying which comprises:

transport means movable across the earth's surface;

substantially vertical hollow cylinder means carried by said transport means, having a wall and closed upper and lower ends;

an earth-contacting plate pivotally mounted to the lower end of said cylinder means for pivoting in an arc direction about an axis substantially perpendicular to the axis of said cylinder means and parallel with the earth's surface and said pivot axis being at the lower end of said cylinder means near said earth-contacting plate, said plate having an earth-contacting surface including a plurality of blade members engageable with the earth's surface;

a piston-like reaction mass slidably contained within said cylinder means;

a liquid contained within said cylinder means forming a liquid-filled volume substantially filling the cylinder means between the lower end of the cylinder means and the reaction mass; and

air gun means contained within said cylinder means between the lower end of said cylinder means and the reaction mass and extending transverse to the axis of said cylinder means, with the axis of the air gun being oriented parallel with said pivot axis, for suddenly discharging an explosive-like burst of expanding compressed gas within said liquid-filled volume, the lower end of said cylinder means serving to focus and direct the burst upwardly toward the reaction mass and forcibly drive the earth-contacting plate down onto the earth's surface.

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**4,712,642**

## SELF-DAMPING CONVOLUTED CONDUIT

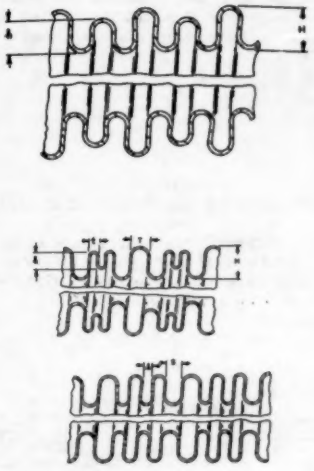
**James M. Lalikos, Springfield, and Harold K. Waite, East Longmeadow, both of Mass., assignors to Titeflex Corporation, Springfield, Mass.**

**Filed Feb. 11, 1986, Ser. No. 828,767**

**Int. Cl.[4] F16F** *7/00*

**U.S. Cl. 181—207** **10 Claims**

1. An automotive exhaust system comprising a self-damping conduit made of metal which is capable of resonant vibrations, said conduit being formed of a convoluted tube having successive convolutions with varying physical dimensions which produce different resonant frequencies of vibration in individual incremental lengths of said conduit, and each incremental



length of said tube having a reaction to physical vibration which counteracts the reaction of its neighboring incremental length to those same physical vibrations, whereby said conduit is self-damping because it does not have a single high amplitude resonant frequency of vibration throughout its entire length.

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**4,712,643**

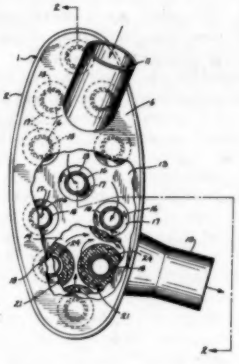
## PARTICULATE TRAP EXHAUST MUFFLER

**Lawrence F. Iles, Madison, and Gary D. Goplen, Stoughton, both of Wis., assignors to Nelson Industries, Inc., Stoughton, Wis.**

**Filed Feb. 17, 1987, Ser. No. 15,743**

**Int. Cl.[4] F01N** *3/02*

**U.S. Cl. 181—231** **14 Claims**



1. A particulate trap exhaust muffler, comprising a casing having an inlet and an outlet, an internal wall disposed within the casing, said wall having a plurality of openings, a plurality of tubes, one end of each tube communicating with one of said

openings and the other end of each tube being closed, each tube having a plurality of holes extending therethrough, and a cylindrical member spaced concentrally outward of each tube, each cylindrical member being permeable to the flow of exhaust gas and being constructed and arranged to trap particulate material in the gas as said gas flows therethrough, exhaust gas entering the inlet flowing through said tubes and then outwardly through said holes and through said cylindrical members chamber for discharge from said outlet.

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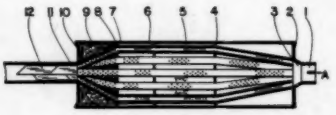
**4,712,644**

## EXHAUST SILENCER FOR INTERNAL COMBUSTION ENGINES

**Yichang Sun, 25 Zhang Zizhong Rod., Tianjin, China**

**Filed Mar. 13, 1986, Ser. No. 839,062**
**Claims priority, application China, Apr. 1, 1985, 85102410**
**Int. Cl.[4] F01N *1/10***
**U.S. Cl. 181—251** **12 Claims**




1. An exhaust silencer for an internal combustion engine having an exhaust pipe, comprising:

a cylindrical shell, said shell having first and second ends, an inner space therebetween and a longitudinal axis;

first and second lids disposed at said first and second ends, respectively, closing said cylindrical shell;

at least one substantially circular spacer dividing said inner space into a plurality of chambers, said chambers having different volumes, said spacer having a plurality of substantially circular openings therein uniformly and circumferentially disposed within said spacer;

front and tail pipes, said tail pipe having a front end including a geometric center and further having an outlet edge having an approximately sinewave profile;

a trumpet pipe having large and small ends, said large end having a geometric center, said front pipe being coupled to said trumpet pipe small end, and said trumpet pipe large end being coupled to said first lid;

said first and second lids each having an aperture for fitting therein said trumpet pipe large end and tail pipe, respectively, said apertures further having geometric centers, said geometric centers being aligned with said longitudinal axis;

a plurality of core tubes extending through said substantially circular openings in said spacer, said core tubes including first and second ends, said ends having cross sections substantially defining a sector of a circle, said core tubes having walls with holes therein coupling the interior volume of said core tubes to said chambers, said core tube holes having flanges;

said core tubes each including a portion parallel to said longitudinal axis and first and second portions deflecting at first and second angles toward the centers of the large end of said trumpet pipe and the front end of said tail pipe, respectively, said first ends of said core tubes being assembled together and inserted into said trumpet pipe large end to form an integral connection therewith; and

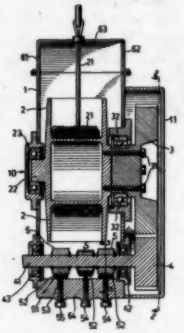
flow dividing plates disposed in said tail pipe.

**4,712,645**

## FIRE ESCAPE DEVICE

**Tzyy Z. Shih, No. 9, Lane 2, Hsinchung Street, Taipei, Taiwan**

**Filed Dec. 29, 1986, Ser. No. 947,363**
**Int. Cl.[4] A62B *1/08***
**U.S. Cl. 182—5** **8 Claims**



1. A fire escape device, comprising:

a supporting cable adapted to be connected, at one end thereof, to a fixed point,

a housing, including a pair of side walls and top and bottom walls,

a drum comprising a shaft thereof extending across an interior of said housing and rotatably mounted in said side walls, with said supporting cable being wound upon said drum at an opposite end thereof and being unwindable therefrom such that said housing can be lowered with respect to said fixed point,

a first gear mounted upon said drum to be rotatable therewith,

a second gear engagable with said first gear and rotatably journaled on an exterior of one of said housing side walls, said second gear comprising a shaft extending across the housing interior,

three fastening rings securely mounted upon said shaft of said second gear,

three corresponding compression rollers, each being mounted directly below a respective one of said fastening rings and being mounted upon said bottom housing wall, and being in continuous contact with said respective rings, and

each of said rings comprising a wavelike outer circumferential surface having at least one convex protrusion and at least one concave depression, with at least one of said compression rollers contacting a respective ring at said convex protrusion thereof, and at least one other compression roller contacting a respective ring in said concave depression thereof.

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**4,712,646**

## LINEMAN'S SAFETY STRAP ASSEMBLY

**Lawrence J. Page, R.R. #4, Division Street North, Cobourg, Ontario, Canada K9A 4J7**

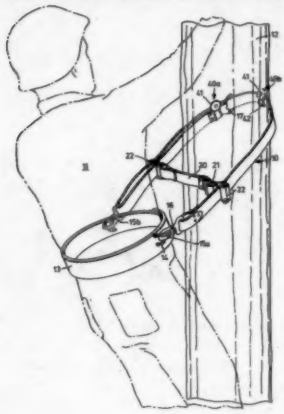
**Filed Mar. 13, 1987, Ser. No. 25,592**
**Claims priority, application Canada, Jan. 12, 1987, 527131**
**Int. Cl.[4] A62B *35/00***
**U.S. Cl. 182—9** **14 Claims**

1. A lineman's safety strap assembly for attachment to a body belt, comprising:

an elongated safety strap terminating in a buckle at one end for varying the length of the safety strap, and in first means for coupling the safety strap to the body belt at the other end of the safety strap, second means for coupling the safety strap to the body belt being slidably mounted on said safety strap;

an inclined sharp edged roller slidably mounted on the safety strap for movement toward the midpoint thereof; and

a cross-belt terminating in means at both ends for slidably coupling the cross-belt to the safety strap at two locations,



thereby forming a closed loop for encircling a pole with the roller facing inwardly, whereby in the event of a fall, the cross-belt bears against the inner face of the pole while the lower edge of the roller is pulled into biting engagement with the outer face of the pole.

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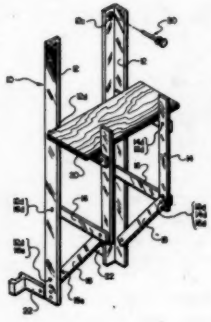
## PORTABLE AND COLLAPSIBLE PLATFORM

**Richard A. Romine, 13251 Cherry St., Westminster, Calif. 92683**

**Filed Sep. 5, 1986, Ser. No. 905,118**

**Int. Cl.[4] E06C *1/383;* E04G *3/10***

**U.S. Cl. 182—96** **21 Claims**



1. A portable and collapsible platform comprising:

(a) a pair of inward vertical members having on their upward end a means for fastening said vertical members to a stationary structure and having along their outward side a plurality of attachment bores,

(b) a pair of outward vertical members having along their side a plurality of attachment bores in horizontal alignment with the respective attachment bores on said pair of inward vertical members,

(c) a plurality of horizontal member pairs each having an attachment bore on each end where inward attachment bores concentrically interface with the attachment bores on said inward vertical members and where outward attachment bores concentrically interface with the respective horizontal attachment bores on said outward vertical members,

(d) a pair of angular support members each having on their lower inward side an attachment bore that concentrically interfaces respectively with an attachment bore located on lower section of said inward vertical member and having on their upper outward side an attachment bore that concentrically interfaces respectively with the lowest outward attachment bores on said outward vertical members and with the outward attachment bores on the lowest of said horizontal members,

(e) means to rotatably attach each of the concentric bore sets, and

(f) a utility platform sized to rest on the top surface of a selected pair of said horizontal members where said platform allows a person to stand or sit while working at a height above the floor or ground.

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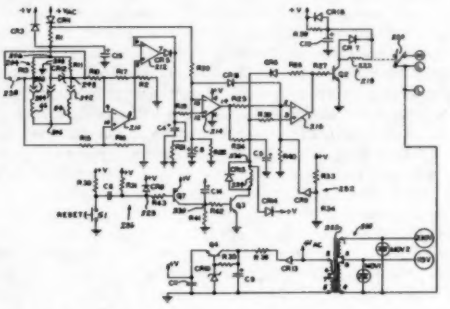
## DUAL MAGNETIC COIL DRIVER AND MONITOR SENSOR CIRCUIT

**Michael F. Mattes, and Mark A. Dorland, both of Durham, N.C., assignors to SSI Technologies, Inc., Janesville, Wis.**

**Filed Aug. 18, 1986, Ser. No. 897,737**

**Int. Cl.[4] H01F *21/06;* G01L *7/16;* F01M *1/22***

**U.S. Cl. 184—6.4** **37 Claims**



1. In a transducer having a delta coil for generating a magnetic flux path through a path of movement of a magnetically permeable member, such that movement of said member changes the return coupled flux linkage, which flux change indicates movement of said member, and having a reference coil spaced sufficiently from said path of movement of said member such that movement of the latter has less affect on return coupled flux linkage of said reference coil than said delta coil, a sensor circuit comprising:

means connecting said coils in respective parallel voltage dividers;

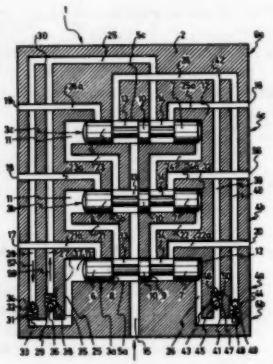
means applying electrical potential across said parallel voltage dividers such that there is no relative phase shift between said coils;

differential amplifier means having a reference input from said reference coil and a comparing input from said delta coil, and having an output, such that when said magnetically permeable member moves in a given direction the voltage at said comparing input of said differential amplifier means increases in a given polarity direction above a given threshold relative to the voltage at said reference input of said differential amplifier means such that said output of said differential amplifier means increases and provides an output error signal.

## 4,712,649
## PROGRESSIVE DISTRIBUTOR FOR LUBRICANTS

**Werner Saam, Oberhausen-Rheinhausen, Fed. Rep. of Germany, assignor to Joseph Vogele AG, Mannheim, Fed. Rep. of Germany**

**Filed Oct. 21, 1986, Ser. No. 921,070**
**Claims priority, application Fed. Rep. of Germany, Dec. 4, 1985, 3542934**
**Int. Cl.[4] F16N *25/02***
**U.S. Cl. 184—7.4** **7 Claims**



**1.** A progressive distributor for lubricants supplied under pressure and discharged in metered amounts through at least one outlet in successive pulses, comprising at least two distributor sections each including a double piston housed in a cylinder chamber for reciprocating between two end positions, a supply passage leading to said cylinder chambers disposed in a common plane of said distributor, and passages interconnecting adjacent cylinder chambers as well as the first cylinder chamber and the last cylinder chamber in said plane and leading to discharge outlets, each of the two end portions of each cylinder chamber acting alternately as a control chamber for the pressurization of the double piston and as a metering chamber for the lubricant expelled therefrom by the displacement of said piston, characterized in that at least each passage **(25, 26)** connecting said first cylinder chamber **(5*a*)** to said last cylinder chamber **(5*c*)** in said plane is formed over at least part of its length of two juxtaposed branch passages **(27, 28; 39, 40)**, that both said branch passages **(27,28; 39,40)** are provided therein with closure elements **(31,35,43,44)** closing in mutually opposite flow directions, and that said closure elements **(31,35,43,44)** are disposed closely adjacent to a metering chamber formed by the end portion **(11,12)** of said cylinder chamber **(5*a*)**.

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## 4,712,650
## HOOD CONVEYING APPARATUS HAVING AN OUTWARDLY REACHING BASKET

**David L. Campbell, Houston, Tex., assignor to Pronto Service Facilities, Inc., Austin, Tex.**

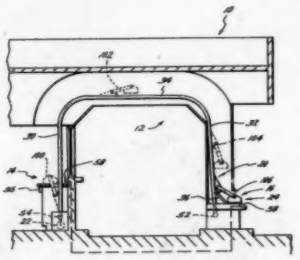
**Filed Mar. 28, 1986, Ser. No. 845,566**
**Int. Cl.[4] B65G *17/16*; E04H *3/04***
**U.S. Cl. 186—41** **18 Claims**

**18.** In a conveyance system having a track with receiving and sending vertical track sections adjacent respective receiving and sending stations, a trolley coupled to the track, and a belt coupled to the trolley for shifting the trolley along the track to the receiving station, the improvement comprising:

elongated arm structure having one end pivotally coupled to the trolley and the other end coupled to a basket,

means for locking the arm structure relative to the trolley as the trolley transits the sending vertical track section and for allowing the arm structure to pivot as the trolley transits the receiving vertical track section, and

shoulder means disposed at the receiving station adjacent said receiving vertical track section for contacting the



basket as the trolley moves towards the receiving station to pivot the arm structure relative the trolley and outwardly shift the basket away from the receiving vertical track section.

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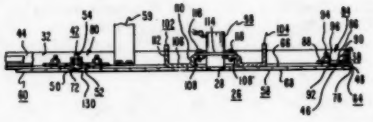
## 4,712,651
## ELEVATOR CAB

**Edward F. Sherwood, Gettysburg, and Karl B. Orndorff, Bonneauville Boro, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed May 15, 1986, Ser. No. 863,486**
**Int. Cl.[4] B66B *11/02*; F21S *1/02***
**U.S. Cl. 187—1 R** **1 Claim**



**1.** An elevator cab, comprising:

a canopy,

sidewalls supporting said canopy,

a frame suspended from said canopy,

a plurality of drop ceiling pan assemblies supported by said frame, with each pan assembly including a metallic sheet member having upper and lower surfaces, and outer edges,

at least two spaced openings in one of said pan assemblies which extend between the upper and lower surfaces of the metallic sheet member,

first and second elongated bracket members fixed in spaced relation to the upper surface of said metallic sheet member, on opposite sides of said at least two spaced openings, to stiffen said metallic sheet member and to provide an elongated space between the spaced bracket members for receiving down lamp fixtures, and a down lamp fixture centered over each of said at least two spaced openings,

each of said down lamp fixtures being disposed between and supported by said first and second elongated bracket members,

each of said first and second bracket members having a cross-sectional configuration which includes first and second horizontally oriented leg portions interconnected by an intermediate leg portion, with the first leg portion being fixed to the second surface of the sheet metal member, and with the down lamp fixtures being fixed to the second leg portions.

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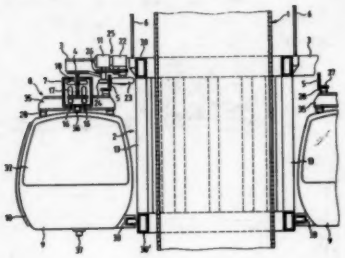
## ELEVATOR FOR TRANSPORTING PEOPLE AND GOODS WITH AN ANNULAR TRAVELLING CABIN

Otakar Smidek, Burgdorf, Switzerland, assignor to Von Roll AG., Gerlafingen, Switzerland

Filed Mar. 17, 1986, Ser. No. 839,953
Claims priority, application Switzerland, Mar. 22, 1985, 1287/85; Nov. 21, 1985, 4969/85
Int. Cl.[4] B66B 9/00; A63G 1/00
U.S. Cl. 187—1 R 19 Claims



1. An elevator system for a building comprising:

a cage arranged around the outer circumference of said building, said cage having an upper cage ring and a lower cage ring interconnected by struts, and a supporting track;

first drive means associated with said cage for selectively raising and lowering same;

a plurality of closed, independent travelling cabins vertically supported on said supporting track in a juxtaposed manner by rollers having a substantially horizontal axis and horizontally supported on said cage by rollers having a substantially vertical axis; and

second drive means associated with said at least one travelling cabin for moving same on said cage around said building.

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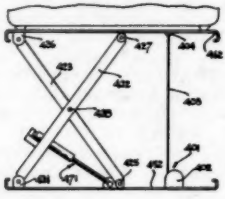
## ENERGY-RECYCLING SCISSORS LIFT

Duane R. Franklin, Northridge; Archibald D. Evans, Thousand Oaks, and Walter J. Hansen, Woodland Hills, all of Calif., assignors to Lift-R Technologies, Inc., Los Angeles, Calif.

Filed Aug. 14, 1985, Ser. No. 765,911
Int. Cl.[4] B66B 11/04
U.S. Cl. 187—18 35 Claims



1. An energy-recycling scissors lift for raising and lowering an article comprising:

a lower support member and upper support member, said upper support member being adapted for vertical motion between a relatively retracted position and a relatively extended position above said lower support member, said upper support member being adapted to hold the article;

a scissors linkage including a first and second scissors leg, said first scissors leg having one end that is pivotally connected to said upper support member and another end that translates along said lower suport member while in operation, said second scissors leg having one end that is pivotally connected to said lower support member and another end that translates along said upper member while in operation;

attachment-structure means secured to said second scissors leg;

a sealed gas cylinder hasving a first end that is pivotally fixed to said attachment-structure means and a second end that is pivotally attached to said lower support member, said sealed gas cylinder being adapted for storing energy when the article and said upper support member is lowered to a retracted position and for moving said upper support member and the article upwardly from said retracted position toward said extended position; and

means for compensating for the force exerted on said upper support member by said sealed gas cylinder.

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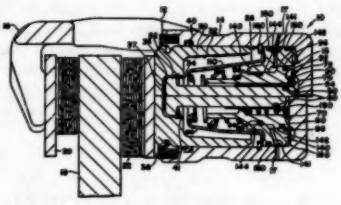
## BRAKE ASSEMBLY WITH MULTIPLE ADJUSTABILITY

Robert B. Temple, and James J. Colpaert, both of Granger, Ind., assignors to Allied Corporation, Morristown, N.J.

Filed Dec. 9, 1986, Ser. No. 939,588
Int. Cl.[4] F16D 65/54
U.S. Cl. 188—71.8 23 Claims



1. A disc brake assembly comprising a caliper connected with a caliper housing having therein a bore, a first piston disposed within the bore for slidable movement therein, a first seal disposed between the piston and caliper housing, a rod extending within said bore and having a head connected with the first piston, resilient means disposed between the first piston and head, the rod having a tube disposed thereabout and the tube having a radially extending flange, a second seal disposed between said rod and tube, a second piston disposed within said bore and about said tube and rod, a first spring disposed between said flange and second piston, a retainer connected with the caliper housing and disposed within said bore, and a second spring located between and biasing apart said retainer and second piston, so that said second seal has a resistance to movement of the rod relative to the tube which resistance is greater than a resistance to movement effected by the first seal for movement of the first piston relative to the caliper housing.

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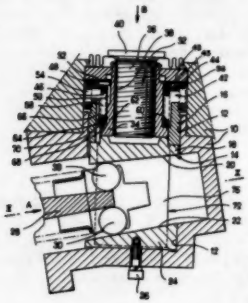
## BRAKE ACTUATOR WITH AUTOMATIC ADJUSTMENT

Jean-Paul Sauvée, Aubervilliers, France, assignor to Bendix France, Paris, France

Continuation of Ser. No. 818,460, Jan. 13, 1986, abandoned. This application May 6, 1987, Ser. No. 45,717
Claims priority, application France, Jan. 25, 1985, 85 01027
Int. Cl.[4] F16D 65/56
U.S. Cl. 188—196 D 5 Claims

1. A brake actuator with automatic adjustment of the type comprising a screw-and-nut actuating mechanism the lengthening of which is controlled by a combined system having a screw-and-nut of reversible pitch mounted within a fixed and a unidirection clutch, operatively connected between said nut and axial body, which is sensitive to relative axial movement between a control piston and said fixed body which houses the control piston, characterized in that the brake actuator com-

prises a device for preventing rotation of the nut of the actuating mechanism and for allowing forced rotation of the nut beyond a predetermined value of torque, the control device comprising two surfaces facing one another and pushed into friction engagement against one another, one surface fixed firmly to the nut and the other surface immobilized rotationally



relative to the fixed body, the other surface formed on an annular component comprising at least one projection entering into an axial groove formed in the control piston, and the control piston immobilized rotationally relative to the body by means of a fork connected to a sleeve of the control piston and fork guided by a reaction component which is fixed firmly to the body.

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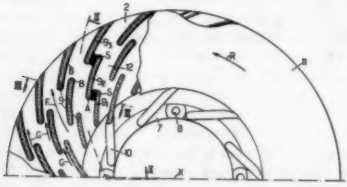
**4,712,656**

## ARMATURE ROTORS FOR ELECTROMAGNETIC BRAKES

**Jean-Claude Courtois, Vigny, France, assignor to Labavia S.G.E., France**

**Filed Jun. 30, 1986, Ser. No. 880,182**
**Claims priority, application France, Jul. 11, 1985, 85 10654**
**Int. Cl.[4] H02K** *49/04, 1/32*
**U.S. Cl. 188—218 XL** **8 Claims**



1. Armature rotor of an electromagnetic brake, comprising at least one disc (2) joined to a fastening ring (7) by a crown of arms (10), a plurality of ventilation fins, the portions of largest diameter (9) of these fins projecting axially on the disc and being inclined to the corresponding radii and their crests being joined to one another by an annular flange (11), characterised in that the fins (9) forming cross pieces between the flange and the disc are constituted by a plurality of sections ($9_1$, $9_2$, $9_3$) each extending over one portion only of the radial width of these two annular elements (2 and 11), each cross-piece section exhibiting the shape of a curved tile orienting its concavity rearwards with respect to the direction of rotation (R) of the rotor, said tiles forming a plurality of concentric rings which are radially overlapping with respect to each other, the tiles composing each ring being identical with one another and equidistant from each other, the numbers of tiles composing the different rings being identical with one another, and each tile of any ring being slightly offset angularly with respect to the outer extension of the closest tile of the ring which is placed immediately radially inside said ring.

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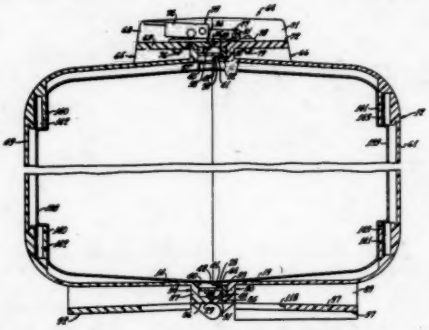
**4,712,657**

## METHOD AND MEANS FOR SEALING A CARRYING CASE

**Jay E. Myers, Laguna Beach, Calif.; M. Todd Myers, New York, N.Y., and Siamak Iravantchi, Lawndale, Calif., assignors to Andiamo Inc., Fountain Valley, Calif.**

**Division of Ser. No. 828,769, Feb. 12, 1986. This application Feb. 4, 1987, Ser. No. 10,693**
**Int. Cl.[4] B65D** *53/00;* **A45G** *13/36*
**U.S. Cl. 190—28** **6 Claims**



1. A carrying case comprising
two sections, each having an outer edge portion
hinge means pivotally interconnecting said sections so that said sections can meet at said outer edge portions thereof, said sections having walls such that said sections define a closed container when said sections so meet at said outer edge portions,
one of said sections defining a recess around said outer edge portion thereof, said recess having sidewall means,
a gasket means within said recess,
the other of said sections including a continuous flange at said outer edge portion thereof, and a plurality of spaced ribs projecting laterally from said flange, said flange being narrower than said recess, said flange when said sections so meet at said outer edges being within said recess and engaging said gasket means for forming a seal therewith,
said ribs when said sections so meet extending to a position of juxtaposition with said sidewall means for reinforcing the joint between said sections.

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**4,712,658**

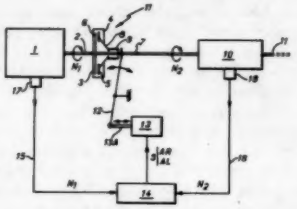
## METHOD OF AUTOMATICALLY OPERATING A CLUTCH RELEASE BEARING ACCORDING TO THE SPEEDS OF THE SHAFTS COUPLED BY AN ASSOCIATED CLUTCH

**Pierre Grunberg, Paris, France, assignor to Valeo, Paris, France**

**Filed Apr. 23, 1986, Ser. No. 854,833**
**Claims priority, application France, Apr. 24, 1985, 85 06221**
**Int. Cl.[4] F16D** *43/04*
**U.S. Cl. 192—0.033** **11 Claims**

1. Method of automatically operating a clutch release bearing in order to re-engage a friction clutch adapted to transmit between first and second rotating shafts a torque depending on the action of said release bearing on a clutch release device associated with the clutch, said clutch release bearing having a predetermined total travel between a clutch released position in which no torque is transmitted between said shafts and a clutch engaged position in which said shafts are coupled together in rotation, in which method the clutch release bearing is moved according to speed modes selected from a plurality of predetermined modes related to the rotation speeds of the first

and second shafts, the clutch release bearing being moved during a first phase in accordance with a first or fast speed mode over at least a predetermined approach travel beyond



which the changing difference between the rotation speeds of the two shafts is monitored and, when a decrease in this difference is detected, a second or slow speed mode is substituted for said first speed mode.

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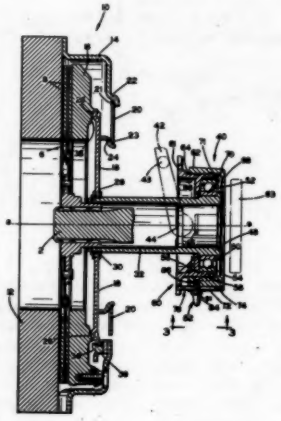
## ADJUSTABLE CLUTCH BRAKE APPARATUS

**Richard A. Flotow, Butler, Ind., assignor to Dana Corporation, Toledo, Ohio**

**Filed Dec. 11, 1986, Ser. No. 940,324**
**Int. Cl.[4] F16D *67/02, 13/75***
**U.S. Cl. 192—13 R** **12 Claims**



1. In a friction disc clutch assembly including friction linings, said clutch assembly having actuating means disposed for selectively coupling an input shaft and an engine fly wheel, said assembly including a clutch release bearing comprising means for disengagement of said clutch assembly, said release bearing comprising inner and outer races mounted upon and secured to an axially moveable sleeve engagable with said actuating means, said release bearing further comprising a clutch brake ring disposed for engagement with a clutch brake wear pad spaced axially thereof for arresting rotational movement of said input shaft upon disengagement of said clutch assembly; an improvement comprising a manual adjusting ring adapted for moving said clutch brake ring toward said wear pad as said friction linings become worn, said adjusting ring being secured directly to the outer race of said release bearing, and having an exterior circumferentially threaded portion thereon, said clutch brake ring having an interior circumferentially threaded portion disposed for mating with said exterior threaded portion of said adjusting ring, said clutch brake ring being secured directly to said adjusting ring via said mating threads, said adjusting ring comprising means for rotating said adjusting ring, whereby said clutch brake ring may be axially adjusted by said rotation of said adjusting ring.

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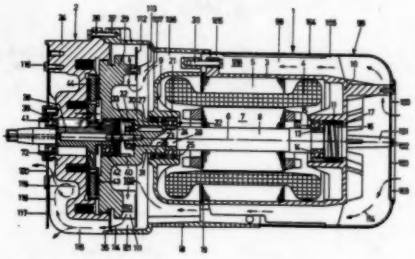
**4,712,660**

## ELECTROMOTIVE VARIABLE-SPEED AND CONTROL DRIVE PARTICULARLY FOR USE IN INDUSTRIAL SEWING MACHINES

**Hans Erndt, Wiesloch; Erich Link, Brühl; Adolf Martin, Rheinstetten; Herbert Palloch, Schwetzingen, Baden, and Hilmar Wittler, Karlsruhe, all of Fed. Rep. of Germany, assignors to Frankl & Kirchner GmbH & Co KG, Schwetzingen, Baden, Fed. Rep. of Germany**

**Filed Mar. 5, 1986, Ser. No. 836,328**
**Claims priority, application Fed. Rep. of Germany, Mar. 8, 1985, 3508310**
**Int. Cl.[4] F16D *67/06, 13/72***
**U.S. Cl. 192—18 B** **7 Claims**



1. An electromotive variable-speed and control device particularly for use in industrial sewing machines comprising: a motor capable of continuous drive and having a motor shaft, a flywheel having a clutch surface and connected to said motor shaft, and a clutch-brake unit for selectively connecting said motor shaft to a drive shaft, said clutch-brake unit comprising a clutch-brake disk which is connected to said drive shaft non-rotatably with respect thereto, said clutch-brake unit also comprising non-rotatable brake bearing bracket having a brake surface, said clutch-brake disk being brought into friction engagement optionally with said brake surface of said brake bearing bracket or optionally with said clutch surface of said flywheel, said motor having a stator frame and an outer shell confining a cooling region surrounding said stator frame, said flywheel, when rotating, forming a fan sucking cooling air, cooling channels confined by cooling ribs being provided at said stator frame and said fan being in the form of an axial-radial blower having a suction region extending close to said clutch surface, said suction region comprising an annular recess in said flywheel and including radial channels leading out from said recess, ribs on said flywheel and an air conductor ring attached to said ribs, said radial channels being confined by said ribs on said flywheel and by said air conductor ring, and said air conductor ring being rotatable with said flywheel.

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**4,712,661**

## OVERRUNNING CLUTCH CAGE

**Frederick E. Lederman, Sandusky, and Donald J. King, Huron, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.**

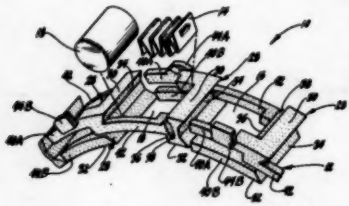
**Filed May 16, 1986, Ser. No. 863,871**
**Int. Cl.[4] F16D *13/75, 41/07***
**U.S. Cl. 192—45** **1 Claim**

1. In an overrunning clutch of the type that has metal wedging elements and a cage that has plastic support portions adapted to fit closely within an annular space between confronting surfaces of a pair of metal rotatable members so as to maintain said rotatable members in coaxial relation to one

another when said clutch overruns, said plastic having a thermal coefficient of expansion and contraction different from said metal rotatable members and a wear resistance less that said wedging elements, an improvement allowing the cage to be easily molded as a unitary structure from the same plastic material as said support portions, while conforming to said annular space with changing temperature without binding, in spite of said different coefficient, and also providing metal armored pockets for retaining said wedging elements, said improvement comprising,

a plurality of cage sections formed of said plastic material and including said support portions, said cage sections being circumferentially spaced relative to one another,

a plurality of alternating spaced connector members extending circumferentially between said cage sections to interconnect said cage sections and also formed of said plastic material, said connector members further being both suffi-



ciently flexible and sufficiently axially spaced from one another so that, as said cage expands or contracts with changing temperature, said cage sections may in turn move circumferentially away from or toward one another with sufficient freedom that said cage will conform to said annular space without forcing said cage sections strongly into either of said confronting surfaces, thereby avoiding binding on either rotatable member, and,

a pair of metal end rings adapted to be joined to said cage in axially spaced relation, thereby forming a plurality of circumferentially spaced armored wedging element retention pockets in cooperation with said cage sections, with said end rings further being joined to said cage sections so as to slip relative thereto when said cage sections move circumferentially toward or away from one another so as to not interfere with the conformation of said cage to said annular space.

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**4,712,662**

## GEARBOX SYNCHRONIZER

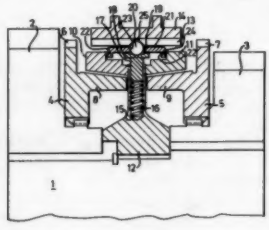
**Peter Elverdam, Mölndal, Sweden, assignor to AB Volvo, Gothenburg, Sweden**

**Filed Oct. 11, 1985, Ser. No. 786,856**

**Claims priority, application Sweden, Oct. 11, 1984, 8405095**

**Int. Cl.⁴ F16D *23/06***

**U.S. Cl. 192—53 F** **9 Claims**



**1.** In a synchronizing device for a gearbox, comprising a synchronizer ring having a conical frictional surface, said synchronizer ring surrounding a synchronizer cone having a cooperating frictional surface, said synchronizer cone being securely joined to a gear rotatably journalled on a shaft, and comprising as well an engaging sleeve non-rotatably but axially displaceably mounted on a locating sleeve, by means of which engaging sleeve the synchronizer ring can be displaced axially from a neutral position to bring the frictional surfaces into engagement with each other, said locating sleeve supporting radially acting spring means which load antifriction bodies into contact with the engaging sleeve, which is provided with cavities in which said bodies engage in the neutral position; the improvement in which the locating sleeve is fixed on the shaft and the spring means load said bodies into direct contact with said engaging sleeve via radially movable cam elements, relative to which the bodies are axially displaceable, said cam elements having cam surfaces thereon that are oppositely inclined radially in opposite axial directions from the position on the cam elements occupied by the bodies in said neutral position, said bodies being in direct rolling contact with said cam surfaces, each body passing freely through a hole in a pusher which is axially displaceable together with the body and which, as the engaging sleeve moves in the engagement direction, pushes the synchronizer ring to move the frictional surfaces into engagement with each other.

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**4,712,663**

## VISCOUS COUPLING FOR A DRIVE SHAFT

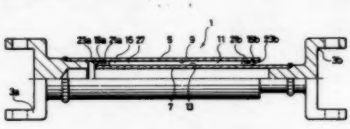
**Masao Teraoka, Sano, Japan, assignor to Tochigifujisangyo Kabushikigaisha, Tochigi, Japan**

**Filed Jul. 14, 1986, Ser. No. 885,219**

**Claims priority, application Japan, Jul. 17, 1985, 60-109277[U]**

**Int. Cl.⁴ F16D *33/00***

**U.S. Cl. 192—58 A** **2 Claims**



**1.** A viscous coupling for a drive shaft, comprising: an elongated tubular first shaft; an elongated cylindrical second shaft extending into and cooperating with said first shaft to define a cylindrical clearance therebetween; bearing means for accommodating both relative rotation and axial displacement of said first and second shafts, said bearing means being interposed between said shafts at the opposite ends of said clearance; sealing means associated with said bearing means for hermetically sealing the opposite ends of said clearance; and, a viscous fluid contained in said clearance, the viscous resistance of said fluid to rotation of one of said shafts relative to the other of said shafts providing a means of transmitting torque therebetween.

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**4,712,664**

## LOAD-OUT CONSTRUCTION DEVICE

**James E. Angus, 906 S. 45th St., Temple, Tex. 76501**

**Filed May 20, 1986, Ser. No. 865,207**

**Int. Cl.⁴ B65G *11/18***

**U.S. Cl. 193—17** **4 Claims**

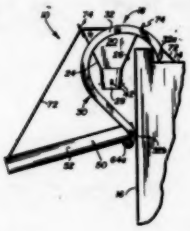
**1.** A load-out device for conveying debris from a building having a roof, floors and an exterior wall comprising:

a hopper having a pair of side walls and a pair of end walls;

suspension means for mounting said hopper to the roof or a floor of the building, said suspension means including a pair of hooks mounted on said end walls of said hopper wherein each of said hooks has a first and second end, such that said first end contacts the roof or floor of the

building and said second end contacts an exterior wall of the building;

a rod pivotally mounted between said second ends of said hooks;



a chute mounted on said rod for receiving debris from said hopper; and

means attached to said chute for adjusting the position of said chute with respect to the building.

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**4,712,665**

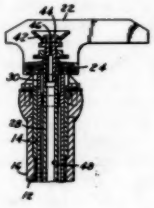
**CONTAINER LIFT MECHANISM**

**Kenneth P. McDonald, Livonia; Badruddin K. Rangwala, Farmington Hills; Barry C. Owen, Southfield, and Frank A. Rodocker, Milford, all of Mich., assignors to Ex-Cell-O Corporation, Troy, Mich.**

**Filed Aug. 7, 1986, Ser. No. 894,177**

**Int. Cl.[4] B65B** *3/00*

**U.S. Cl. 198—346.2** **8 Claims**



1. A container lift mechanism comprising a set of spaced lifting rails mounted at the top of a vertically oriented tubular actuator, first lifting means operatively connected to said actuator for vertically lifting same, a vacuum cup independently mounted between said spaced rails, and second lifting means operatively connected to said tubular actuator for vertically lifting said vacuum cup relative to the movement of said tubular actuator for at times engaging the bottom of a container riding on said rails.

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**4,712,666**

**DEVICE TO COUNT BARS**

**Giancarlo Roseano, Buttrio, Italy, assignor to Danieli & C. Officine Meccaniche SpA, Buttrio, Italy**

**Continuation of Ser. No. 610,581, May 15, 1984, abandoned. This application May 30, 1986, Ser. No. 869,817**

**Claims priority, application Italy, Jul. 27, 1983, 83429 A/83**

**Int. Cl.[4] B65G** *47/12*; **G06M** *7/00*

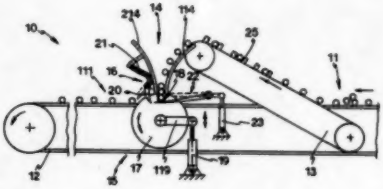
**U.S. Cl. 198—503** **17 Claims**

1. A device for facilitating the counting of bars, comprising:

first conveyor means located at a first, lower level, said bars being randomly disposed thereon;

inclined conveyor means to move only one portion of said bars upward to a second, higher level, the remainder of the bars remaining at the first level;

guide funnel means for receiving said one portion of said bars from said inclined conveyor means at said second level, and capable of arranging said one portion of said bars in an ordered manner wherein the one portion of said bars are placed next to each other in single fashion;



counting means for counting the bars; and

withdrawal means for withdrawing said one portion of said bars one by one from said guide funnel means, for causing said one portion of said bars to activate said counting means, and for depositing said bars on a second conveyor means located at said first, lower level.

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**4,712,667**

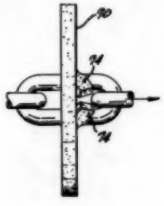
**DEVICE FOR RECOVERING FLUID FROM A WELL**

**Owen E. Jackson, 7501 E. McCormick Pkwy., Ste. 207, Scottsdale, Ariz. 85258, and Thomas W. Donaldson, 2460 Lemon Ave., Signal Hill, Calif. 90806**

**Continuation-in-part of Ser. No. 573,022, Jan. 23, 1984, abandoned. This application Mar. 26, 1985, Ser. No. 716,343**

**Int. Cl.[4] B65G** *15/00*

**U.S. Cl. 198—643** **2 Claims**



1. A device for recovering fluid from a well comprising:

an endless chain of rigid link members adapted to be suspended down a well,

drive means for moving said chain through said well,

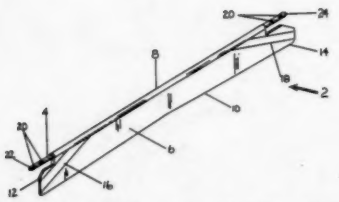
a wiper through which said chain passes, said wiper comprising a flexible plate, said plate having pairs of holes, the holes of each said pair being spaced a distance from each other an amount substantially equal to the largest transverse dimension of said link members and said holes having a diameter corresponding to the smallest transverse dimension of said link members, whereby said holes wipe the sides of said link members, said wiper further having movable flaps defined by intersecting cross cuts each extending between a respective pair of said holes, whereby said flaps wipe the ends of said link members.

4,712,668

## FLIGHT FOR USE ON A CONVEYOR BELT

Ralph Gray, 31-249 Cedarbrae Avenue, Waterloo, Ontario, Canada N2L 4S8

Filed Feb. 24, 1986, Ser. No. 832,355
Int. Cl.[4] B65G 15/42
U.S. Cl. 198—698 6 Claims



1. A flight for use as part of a conveyor belt for agricultural equipment, said flight comprising an elongated support rod and wing, said wing having one edge that is affixed to said rod throughout most of its length with an opposite edge of said wing being a free edge, said wing being of bendable but reasonably stiff material, said wing being symmetrical about a plane normal to a mid-point of said rod, said wing having two free ends that are not affixed to said rod and are slightly narrower than a remainder of said wing, said free ends being able to move back and forth relative to said rod, each of said free ends being stiffened by a metal cable embedded in reinforcing ribs affixed to said wing and extending at an angle from each free end to said rod, each metal cable having one end that is affixed to said rod, said rod having means whereby said rod can be affixed to the conveyor belt so that the wing can extend substantially normal and outward relative to said conveyor belt when the flight is in use.

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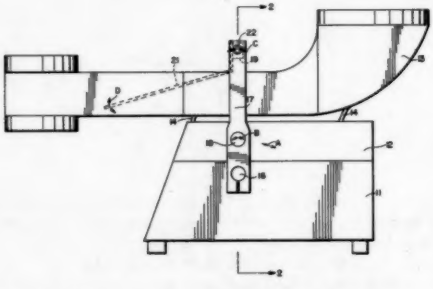
4,712,669

## VIBRATORY MATERIAL FEEDER WITH VIBRATING GATE

Marcel Rohr, Unterfeldweg, Switzerland, assignor to K-Tron International, Inc., Pitman, N.J.

Filed Dec. 30, 1986, Ser. No. 947,856
Int. Cl.[4] B65G 27/00
U.S. Cl. 198—771 7 Claims



1. A vibratory material feeder comprising:

a base portion and a vibrating portion, including a material feed tray, moveable relative to said base portion;

vibrating gate support means having first and second ends, said first end being rotatably connected to said base portion, and said vibrating portion being rotatably connected to said support means at a point intermediate said first and second ends; and

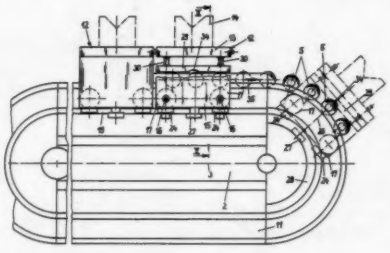
vibrating gate means fixed to said second end of said support means and extending into said material feed tray.

4,712,670

## MECHANISM FOR THE TRANSPORTATION OF OBJECTS

Volker Burkhardt, Lerchenstr. 29, D-7085 Bopfingen, Fed. Rep. of Germany

Filed Nov. 18, 1985, Ser. No. 799,844
Claims priority, application Fed. Rep. of Germany, Dec. 12, 1984, 3445249
Int. Cl.[4] B65G 17/24
U.S. Cl. 198—803.01 13 Claims



1. A mechanism for transportation of objects on an endless rotating roller chain which runs on a support structure, wherein said support structure (1,37) comprising straight and curved conveyor sections connected together end-to-end to form a substantially oval endless path, each conveyor section has an outwardly facing U-section (20) secured to its sides and a rail formed on the top portion of the conveyor section; the roller chain comprising a plurality of links each having at least three rollers (5, 6, 36) on the same axis and each link connected to the next by a fishplate means (7) to form a continuous roller chain, at least one roller of said links engages with said rail; and wherein a plurality of carriages (12), having work piece-receiving elements (14) for accommodating the objects to be transported, are carried by the roller chain, each comprise a base plate (13) having a laterally downwardly projecting cover (15) on each side thereof supporting tread rollers (17) and guide rollers (24) on their lower ends which engage with said U-sections (20) and guide said carriages (12), wherein said carriages (12) being frictionally supported by said roller chain (4), in straight conveyor sections, by means of friction-carrier element (29) and being connected, in curved sections, by a roller engaging recess (34) on said friction-carrier element (29).

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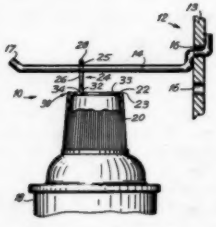
4,712,671

## UNIVERSAL HANGING PACKAGING SYSTEM

Frank S. Salacuse, 710 Park Ave., New York, N.Y. 10021

Filed May 27, 1986, Ser. No. 867,829
Int. Cl.[4] B65D 5/50
U.S. Cl. 206—44 R 10 Claims



1. A system adapted to hang a packaged product at a display rack having at least one horizontal mounting rod extend from the rack, said rod having a free end spaced from said rack, comprising, in combination:

a container,

a plastic cap removably mounted on said container, said plastic cap having a flat top surface, said cap comprising,

at least one flat tab of single layer plastic, said tab and cap being of unitary integral-mold type construction,

said tab including a loop portion forming a hole capable of being received by said rod free end, and further including,

a flexible plastic hinge integrally joining the tab with the cap,

said tab being rotatably movable about said hinge between an operative position for being received by said rod, and a nonoperative position, wherein in said nonoperative position said tab is parallel with said cap top surface, and in said operative position said tab is positioned approximately perpendicular to said flat top surface,

said cap flat top including a recess for receiving said flat tab when said tab is in the nonoperative position, there being no cap material above said hole in the nonoperative position, adding to stacking height,

said loop portion including a continuous wall having an inner side surface defining said hole and having an outer side surface, and said recess having an inner side surface adapted to fit closely with said outer surface when said at least one tab is in said nonoperative position,

said loop portion having a flat bottom side and said recess being further defined by a flat bottom surface,

said flat bottom surface being continuous with said cap top, there being no opening by way of said recess through said cap top,

said flat bottom side being positioned against said flat bottom surface when said tab is in said nonoperative position.

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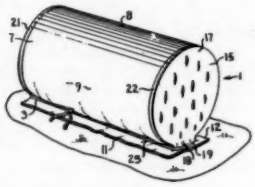
**4,712,672**

## HAY BALE COVER

**George N. Roy, 401 W. North, Apt. B, Warrensburg, Mo. 64093, and James Roy, Rte. 1, Spickard, Mo. 64679**

**Filed Jun. 6, 1986, Ser. No. 871,554**
**Int. Cl.[4] B65D** *71/00*
**U.S. Cl. 206—83.5** **10 Claims**



1. A cover for a cylindrical hay bale sized to cover a large hay bale comprising:

(a) a sleeve member having a first configuration and a second configuration; said sleeve member having an elongate semi-circular top portion and opposed side portions; said top portion having semicircular edges at opposite ends thereof, each of said semi-circular edges having a common radius associated therewith; each of said side portions being attached at the top thereof to respective horizontal lower edges of said top portion; said side portions in said first configuration extending vertically down from respective lower edges of said top portion and each of said side portions having a height substantially greater than said common radius; said side portions being sized such that when said sleeve member is placed in said first configuration wherein said cover is adapted to cover a hay bale having a radius substantially equal to said common radius, said top portion is adapted to cover the entire top of the bale and said side portions extend down so as to be engageable with a ground surface supporting the bale; said side portions in said second configuration being flexible and adapted to be tucked inwardly toward a bale being covered by said cover such that the side portions engage both the ground surface and the bale; and

(b) opposite end members each having an inverted U-shape periphery with an upper semi-circular edge thereof being directly connected with a respective semi-circular edge of said top portion and having lower side edges of equivalent length to respective edges of respective side portions and being connected therewith and further having a generally horizontal lower edge in said first configuration; each of said end members being positioned to extend between respective semicircular side and lower edges; said end members, said top portion and said side portions forming an integral enclosure with only an open bottom in said first configuration; said cover being made of a flexible and foldable, waterproof sheet material shaped to substantially enclose the cylindrical hay bale with a bottom thereof reposed on a supporting surface in said second configuration, whereby said cover is adapted to fit over said bale with said side portions and said end member lower portions tucked inwardly between the reposed bale bottom and the supporting surface in covering relation to said bale.

9. In combination with a generally cylindrical large bale reposed on a side in an open area on a supporting surface, a covering for the bale comprising:

(a) a bale cover having a semi-cylindrical portion with side portions depending therefrom, and end portions with side and top margins secured to the adjacent edges of the semi-cylindrical portion and sides thereof; said depending sides being of a length to have lower portions folded against the supporting surface when the semi-cylindrical portion is resting on said cylindrical bale;

(b) said folded lower portions being movable to extend between said cylindrical bale and the supporting surface and engaged therebetween to substantially secure said cover to said cylindrical bale; and

(c) including said cover covering said bale and a tie being received in said folded lower portions and extending around said cover such that said cover is between said bale and the said tie and said tie is drawn snugly so as to hold said cover securely over said bale.

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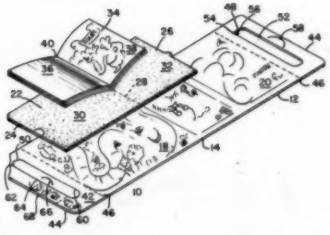
**4,712,673**

## COMBINATION FOOD CARRIER AND AMUSEMENT DEVICE

**Richard A. Moore, Marietta, Ga., assignor to Western Publishing Company, Inc., Racine, Wis.**

**Filed Mar. 31, 1986, Ser. No. 846,075**
**Int. Cl.[4] B65D** *25/30, 77/02, 77/04*
**U.S. Cl. 206—232** **17 Claims**



1. A combination food carrier and amusement device comprising first and second panels connected together by means of a fold line, a removable bag member disposed between the inner surfaces of said first and second panels, said bag member being secured between said inner surfaces of said first and second panels by retaining means, a book disposed between the inner surfaces of said first and second panels, said book being secured between said inner surfaces of said first and second

panels by fastening means, a handle portion provided on said first and second panels, and a handle mechanism provided on each of said handle portions, said handle mechanism including an aperture provided in said second panel and a corresponding partially cut out portion provided on said first panel.

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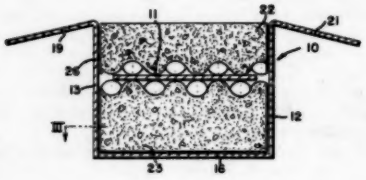
4,712,674

## CONTAINER FOR STATIC-SENSITIVE ARTICLES

William I. Young, North Situate, Mass., assignor to Hy-Con Products, Inc., Framingham, Mass.

Continuation of Ser. No. 715,203, Mar. 25, 1985, Pat. No. 4,610,353. This application May 7, 1986, Ser. No. 860,499
The portion of the term of this patent subsequent to Sep. 9, 2003, has been disclaimed.
Int. Cl.[4] B65D *73/02*
U.S. Cl. 206—328 5 Claims




1. Container for use with an article which can be damaged by static electricity, comprising:

a plurality of walls forming a cell in which the article resides, each wall consisting of a sheet of corrugated board made up of an outer web, an inner web, and a corrugated flute web that is sandwiched between the inner and outer webs, at least one web being formed with a substantially uniform, electrically-conductive dispersion of conductive particles, wherein the walls have a surface conductivity and bulk conductivity in the range from $10^3$ to $10^9$ ohms/-squares, wherein the container contains electrically-conductive foam plastic packing, consisting of a block of electrically-conductive foamed plastic packing enclosed in the container and having a conductivity in the order of $10^7$ ohms/square, wherein the foam plastic is of the open-cell type and is impregnated with carbon particles during its manufacture.

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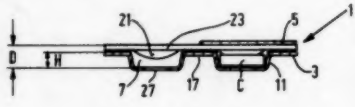
4,712,675

## TAPE PACKING FOR ELECTRICAL OR ELECTRONIC COMPONENTS

Gerard J. Scholten; Louis F. A. Dieleman, and Johannes M. M. Blankers, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 27, 1986, Ser. No. 923,260
Claims priority, application Netherlands, Nov. 8, 1985, 8503063
Int. Cl.[4] B65D *85/30*
U.S. Cl. 206—332 3 Claims




1. A tape packing for electrical or electronic components comprising a strip-shaped carrier with lateral and longitudinal dimensions and formed at least in part of metal, said carrier having cavities for receiving the components, said cavities being formed along the longitudinal dimension at regular distances by means of a cold drawing process and having side walls which extend along the longitudinal dimension of the carrier and at right angles thereto, said carrier including edge zones extending on either side of the cavities along the longitudinal dimension, barriers at right angles to the longitudinal dimension between successive cavities, at least one series of transport holes, and a covering tape closing the cavities, said covering tape adhering to the edge zones, and wherein the side walls of the cavities, which extend along the longitudinal dimension of the strip-shaped carrier, are provided with openings, which are bounded by an associated edge zone.

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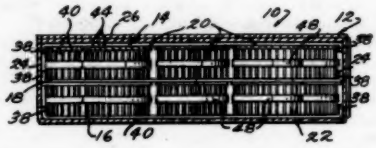
4,712,676

## SHIPPING PACKAGE CONTAINING COILED FASTENER PACKAGES

Warwick Randall, Warwick, R.I., assignor to Stanley-Bostitch, Inc., East Greenwich, R.I.

Continuation of Ser. No. 661,475, Oct. 16, 1984, abandoned.
This application Mar. 3, 1986, Ser. No. 837,320
Int. Cl.[4] D65D *85/24*
U.S. Cl. 206—338 11 Claims




1. A shipping package comprising: an exterior carton having a rectangular bottom, four interconnected sides extending up from the periphery of said bottom and a top closure,

said bottom, sides and top closure defining an interior space,

a bottom panel extending within said interior space adjacent said bottom,

a top panel within said interior space adjacent said top closure,

at least one divider panel extending within said interior space in generally parallel relation with said bottom and top closure,

said bottom panel including an upwardly facing corrugated sheet having flat sheet means fixed to its opposite face,

said top panel including a downwardly facing corrugated sheet having flat sheet means fixed to its opposite face,

each divider panel including a downwardly facing corrugated sheet, an upwardly facing corrugated sheet and flat sheet means fixedly connected between and with the opposite faces of said upwardly facing corrugated sheet and said downwardly facing corrugated sheet,

each corrugated sheet including a multilplicity of elongated continuous side-by-side alternating ridges and troughs defining corrugations,

each end of each divider panel being folded transversely along a marginal line perpendicular to the longitudinal extent of the corrugations in closely spaced parallel relation to the associated end edge thereof and being mounted in said interior space in said folded relation,

said panels dividing said interior space into a plurality of tiered spaces,

each tiered space being defined along its lower surface by an upwardly facing corrugated sheet and along its upper surface by a downwardly facing corrugated sheet, and

a plurality of coiled fastener packages within each tiered space,

each coiled fastener package presenting a multiplicity of fastener heads defining one end thereof and a multiplicity of fastener points defing the other end thereof,

said panels and coiled fastener packages being vertically compressed within said exterior carton,

each coiled fastener package being vertically compressed within its associated tiered space against movement by virtue of the fastener head defining end thereof engaging

one of the corrugated sheets defining the same so as to collapse the engaged corrugations thereof and the fastener point defining end thereof engaging the other of the corrugated sheets defining the same so as to penetrate the engaged corrugations thereof.

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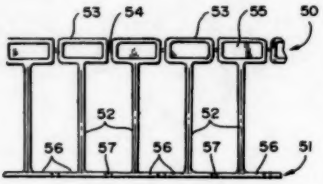
**4,712,677**

## METHOD AND APPARATUS FOR DISPENSING FASTENERS

**David B. Russell, Southborough, Mass., assignor to Dennison Manufacturing Company, Framingham, Mass.**

**Continuation of Ser. No. 147,000, May 6, 1980, abandoned, which is a continuation of Ser. No. 827,276, Aug. 24, 1977, abandoned. This application Jul. 20, 1981, Ser. No. 284,439**
**The portion of the term of this patent subsequent to Jun. 26, 2001, has been disclaimed.**
**Int. Cl.⁴ B65D *85/24***
**U.S. Cl. 206—345** **5 Claims**




1. In fastener stock of the type comprising two continuous and elongated plastic side members that are cross-coupled by a plurality of filaments, the stock being proportioned to be fed as a unit to a position where individual fasteners are separated therefrom within a machine, one of said side members being proportioned so that each separated fastener includes an end-bar formed from a portion of the said side member and is configured for feeding through the bore of a hollow needle having a longitudinal slot for passage of the associated filament, and in which each filament is foldable towards the associated end-bar that is feedable through said hollow needle; the improvement adapted for continuous molding in long lengths and for feeding and dispensing individual fasteners therefrom with dispensing apparatus which advances the end fastener adjacent the rear portion of the needle bore and moves its end-bar into alignment with said bore and contacts said end-bar with a plunger to separate the end-bar from the stock and force it through said bore; said improvement comprising fastener stock wherein each of said filaments is molded with a cross-section having its maximum width at a substantially flat plane at one side thereof, said end-bars being wider in cross-section at said plane than in other planes parallel thereto, and wherein adjacent end-bars are connected end-to-end at a portion of their peripheries adjacent to said plane by severable connectors located substantially at said plane.

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**4,712,678**

## CONTAINER HAVING AUTOMATIC DOORS AND FOR ACCOMMODATING DATA STORAGE MEDIA

**Peter Ackeret, Küsnacht, Switzerland, assignor to IDN Inventions and Development of Novelties AG, Chur, Switzerland**

**Continuation of Ser. No. 570,912, Jan. 16, 1984, Pat. No. 4,640,415. This application Nov. 13, 1986, Ser. No. 929,833**
**Claims priority, application Fed. Rep. of Germany, Jan. 15, 1983, 3301203; European Pat. Off., Aug. 29, 1983, 83108481.9**
**The portion of the term of this patent subsequent to Feb. 3, 2004, has been disclaimed.**
**Int. Cl.⁴ B65D *85/57, 85/672***
**U.S. Cl. 206—387** **31 Claims**

1. A container for accommodating data storage media, said media including magnetic tape cassettes and disks, said container comprising:

a housing having at least one small side and having an opening in said small side thereof;

a media transport slider, said slider being accommodated in said opening;

spring means acting between said housing and said slider for causing ejection of said slider from said housing, said slider on ejection from said housing transporting a data storage medium accommodated thereon through said opening into a position wherein said medium is accessible for removal;

door means pivotably connected to said housing for closing said opening and forming a data storage medium accommodation space, said door means being pivotable between open and closed positions;

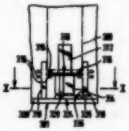
locking means for locking said slider and a medium inserted thereon against the bias of said spring means; and

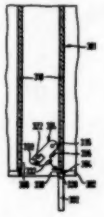
release means for manually unlocking said locking means; wherein:

said door means is coextensive with all but a portion of said opening;

said slider further has an element projecting into said portion of said opening when said slider is moved into said data storage medium accommodation space, said element remaining uncovered by said door means;

said release means is located on said projecting element; and





said door means is positively moved between its opened and closed positions responsive to movement of said slider.

11. A container for accommodating at least one data storage medium, said container comprising:

(a) a housing having a base wall, a top wall, two side walls, a rear wall, and an open front face opposite the rear wall, and having at least one compartment therein;

(b) at least one slider member each for holding at least one data storage medium, the number of slider members at least corresponding to the number of compartments, said slider member being received in said compartment and being slidably movable into and out of the housing, the data storage medium being accessible for insertiion or removal when the slider member is out of the housing;

(c) locking means for retaining the slider member in the housing;

(d) biasing means for ejecting the slider member from the housing when the locking means is released;

(e) door means separate and distinct from the slider member, said door means being movable between an open position and a closed position for opening and closing the open front fact of the housing; and

(f) spring means biasing said door means into said closed position when said slider member is locked in said housing, said door means being operatively connected to said

spring means, said slider member having actuating means to overcome said spring bias upon said locking means being unlocked and said slider member being ejected, for moving said door means into said open position.

23. A container for accommodating at least one data storage medium, said container comprising:

(a) a housing having a base wall, a top wall, two side walls, a rear wall, and an open front face opposite the rear wall, and having at least one compartment therein;

(b) at least one slider member each for holding at least one data storage medium, the number of slider members at least corresponding to the number of compartments, said slider member being received in said compartment and being slidably movable into and out of the housing, the data storage medium being accessible for insertion or removal when the slider member is out of the housing;

(c) locking means for retaining the slider member in the housing;

(d) biasing means for ejecting the slider member from the housing when the locking means is released;

(e) door means separate and distinct from the slider member, said door means being movable between an open position and a closed position for opening and closing the open front face of the housing; and

(f) coupling means operatively connecting said slider member and said door means for transmitting an opening drive force to said door means upon ejection of said slider member, and for transmitting a closing drive force to said door means upon said slider member being moved into said housing.

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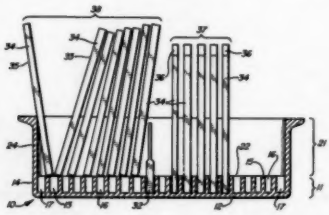
**4,712,679**

## ORGANIZER FOR COMPACT DISC ALBUMS AND THE LIKE

**Gary C. Lowe, 9321 Mansfield, Morton Grove, Ill. 60053**

**Filed Oct. 22, 1986, Ser. No. 921,548**
**Int. Cl.[4] B65D *85/672***
**U.S. Cl. 206—387** **9 Claims**



1. A container for thin rigid envelopes, each envelope having uniform size and characterized by length greater than width and thickness not more than 25% of width, wherein the envelopes may be organized in each of two modes and which comprises

a bottom;

a lower perimetral member extending upwardly from the bottom;

interior wall portions connected with the bottom and having a height not exceeding the height of the lower perimetral member which define a plurality of cavities whereof each has an upper open end of which one dimension exceeds the width of the envelope but is less than the length of the envelope and another dimension exceeds the thickness of the envelope;

a first ledge extending from the perimetral member along one portion of the container,

a second ledge, opposed to the first ledge and extending from the perimetral member along another portion of the container, and

an upper retaining member connected with each ledge;

so for one organizational mode an envelope may be inserted, width-edge downward, into a cavity and carried on the bottom, and, for another organizational mode, at least one such envelope may be placed length-wise onto the opposed first and second ledges, supported at each of its lower corners by one of the ledges, and kept from lateral displacement by the upper retaining member.

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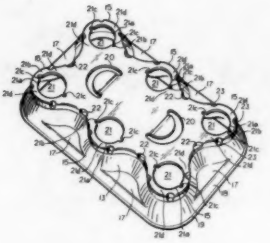
**4,712,680**

## REINFORCED SELF-CENTERING PLASTIC CARRIER FOR BOTTLES

**Aldo Panazzolo, Perrysburg, Ohio, assignor to Owens-Illinois Plastic Products Inc., Toledo, Ohio**

**Continuation-in-part of Ser. No. 834,133, Feb. 24, 1986, which is a continuation of Ser. No. 663,651, Oct. 22, 1984. This application Mar. 27, 1986, Ser. No. 845,211**
**Int. Cl.[4] B65D *65/00***
**U.S. Cl. 206—427** **24 Claims**



1. A single piece carrier for carrying a plurality of filled and capped bottles from the upper portions thereof, said carrier comprising:

a top panel having an outer periphery;

a peripheral wall extending downwardly from said outer periphery of said top panel, said peripheral wall having plural outwardly convex arcuate first wall portions and plural outwardly concave arcuate second wall portions disposed intermediate said first wall portions, said second wall portions blending with said first wall portions to define plural compartments for said bottles, said peripheral wall merging with said top panel at a juncture between said peripheral wall and said outer periphery of said top panel;

a plurality of spaced apart apertures in said top panel, each of said plurality of apertures being adapted to have the upper portion of one of said plurality of bottles inserted thereinto, each of said plurality of apertures having a plurality of tabs extending radially inwardly from the periphery of said each of said plurality of apertures, each of said plurality of apertures further having a plurality of spaces, a space being provided between adjacent tabs, each of said spaces having a radial depth and a bottom to said radial depth, the bottoms of said plurality of spaces defining a circle having a diameter, said plurality of tabs in said each of said plurality of apertures being adapted to releasingly engage and support said one of said plurality of bottles, at least an arcuate portion of said each of said plurality of apertures being disposed adjacent to and generally concentric with at least an arcuate portion of one of said plural outwardly convex first wall portions of said peripheral wall and forming an arcuate strip with said at least an arcuate portion of one of said plural outwardly convex first wall portions of said peripheral wall; and

at least two spaced apart centering and reinforcing lug projections adjacent each of said plurality of spaced apart apertures in said top panel, each of said centering and reinforcing lug projections extending radially inwardly and downwardly from said juncture between said peripheral wall and said top panel in said arcuate strip between

said at least an arcuate portion of said one of said plural outwardly convex first wall portions of said peripheral wall and said at least an arcuate portion of said each of said plurality of apertures, each of centering and reinforcing lug projections extending radially inwardly substantially to said circle and serving to help to center said upper portion of said one of said plurality of bottles as said upper portion is inserted into said each of said plurality of apertures; said at least two spaced apart centering and reinforcing lug projections serving to reinforce at least one of said tabs in said each of said plurality of apertures.

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**4,712,681**

**METHOD OF PACKAGING ARTIFICIAL IMPLANTS IN STERILE AND CONTAMINATION-FREE MANNER AND A PACKAGE THEREFOR**

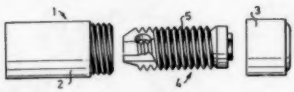
**Per-Ingvar Branemark, Ändergatan 3, S-431 39 Mölndal; Bengt Kasemo, Tjärkil 1400, S-464 00 Mellerud, and Jukka Lausmaa, Pontus Wiknersgatan 3, S-411 32 Göteborg, all of Sweden**

**Filed Dec. 26, 1985, Ser. No. 813,355**

**Claims priority, application Sweden, Dec. 27, 1984, 8406592**

**Int. Cl.[4] A61B *17/06*; B65D *81/08***

**U.S. Cl. 206—438** **11 Claims**



1. A method of packaging artificial implants for sterile and contamination-free storage, comprising positioning the implant inside a closable capsule made of the same material as the implant, thereafter enclosing the capsule in a hermetically sealable outer casing which is then hermetically sealed, and sterilizing the package thus produced, wherein said implant is removed from the casing and capsule prior to implantation.

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**4,712,682**

**ELECTRONIC VALVE CONTROL FOR SLOUGHING MACHINES**

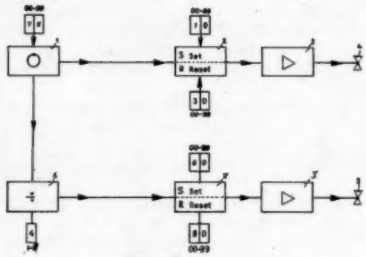
**Ulrich Reilard, Gelsenkirchen, Fed. Rep. of Germany, assignor to M.A.N.Maschinenfabrik Augsburg-Nürnberg Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Oct. 4, 1985, Ser. No. 784,514**

**Claims priority, application Fed. Rep. of Germany, Oct. 9, 1984, 3437009; Aug. 31, 1985, 3531240**

**Int. Cl.[4] B03B *5/20*, *5/24***

**U.S. Cl. 209—455** **15 Claims**



1. A method of electronically controlling the sloughing strokes of a wet sloughing machine having inlet and outlet valves that are opened and closed by respective command pulses, comprising generating recurrent signal codes that are adjustable to represent an adjustable stroke frequency, operating an inlet sloughing stroke generator as a function of the signal codes to generate command pulses for the inlet valve, dividing the signal codes according to a selected clock sequence to form divided signal codes, operating an outlet sloughing stroke generator as a function of the signal codes to generate command pulses for the outlet valve, and influencing the formation of the command pulses for the outlet valve according to the divided signal codes.

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**4,712,683**

**DISPLAY CARD OF PLASTIC MATERIAL WITH TWO ANTI-THEFT SYSTEMS**

**Pierre Cazin, St. Pierre les Nemours, France, assignor to Nestec, S.A., Vevey, Switzerland**

**Filed Dec. 13, 1982, Ser. No. 449,337**

**Int. Cl.[4] B65D *73/00***

**U.S. Cl. 206—478** **6 Claims**

1. A display card of plastic material, usable in particular for elongated articles such as collars and leashes for cats or dogs, distinguished in that in includes:

a device, preferably lateral, for hanging the card on a bar of a display unit;

a first longitudinal anti-theft device comprising an elongated strap of plastic material with one of the ends of the strap being hingedly secured to the card, and the free end of the strap having a plurality of ratchet teeth which are adapted to be inserted through and secured in a slot in the card adjacent the free end of the strap;

a second anti-theft device similar to the first, disposed in a direction perpendicular to that of the first device;

and a notch in the bottom edge of the card, with the card having an opening adjacent said notch, said opening and said notch being sized to permit the article to pass from the front surface of the card, through said opening to the back of the card and around said notch to the front surface of the card.

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**4,712,684**

**BAG DISPENSING ARRANGEMENT**

**Hugo Boeckmann, Arlington Heights, Ill., assignor to Minigrip, Inc., Orangeburg, N.Y.**

**Filed Aug. 5, 1985, Ser. No. 762,762**

**Int. Cl.[4] B65D *85/67***

**U.S. Cl. 206—554** **7 Claims**

1. A chain bag dispensing arrangement, comprising a packet having:

a container defining a housing having a bottom wall;

a pack of unfilled chain bags within said container, said bags being connected by frangible link means;

said bottom wall having a slot along one edge of the pack;

said bags being guided from the top the stack and down between said edge of the pack and a vertical wall of the container to said slot; and

said slot having surface means so that each succeeding bag can be braked and stopped when partially withdrawn from the pack by pull applied through a lead bag and the frangible link means connecting the lead bag to the succeeding bag then broken to separate the lead bag from the next succeeding bag.

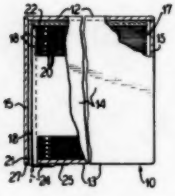
6. A chain bag dispensing arrangement, comprising a packet having:

a container defining a housing having spaced horizontal walls and a vertical front wall;

a pack of unfilled chain bags within the container housing;

frangible link means connecting said bags end-to-end into a chain;

one of said horizontal walls having a dispensing slot contiguous to said front wall so that a vertically facing free edge of said front wall provides an unobstructed front edge along said slot over which said bags can be pulled seriatim from said pack;



said edge being a stop shoulder against which each succeeding bag can be braked and stopped by thrusting the succeeding bag against the edge stop shoulder, when partially withdrawing from the pack by a pull applied through a lead bag, and the frangible link means connecting the lead bag to the succeeding bag broken to effect separation of the lead bag from the succeeding bag as a result of continued pulling on said lead bag while said succeeding bag is stopped against said edge stop shoulder;

said one wall being the bottom wall of the container and said pack of chain bags being supported on said bottom wall;

said slot being in said bottom wall along one edge of the pack; and

said bags being guided from the top of the stack down between said edge of the pack and said vertical front wall of the container to said slot.

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**4,712,685**

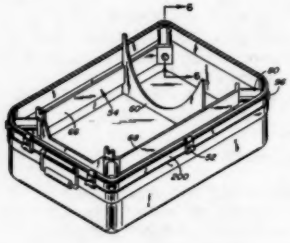
**CONTAINERIZED SHOCK MOUNT**

**James J. Kirchhan, 23912 Flores Ave., Laguna Niguel, Calif. 92677**

**Filed Sep. 5, 1986, Ser. No. 904,343**

**Int. Cl.[4] B65D *81/10***

**U.S. Cl. 206—591** **20 Claims**



1. A container for receipt of equipment to be maintained therein wherein said container is formed from two portions that have edge regions thereto to provide a closure wherein the improvement comprises:

a substantially rigid frame member held at the outer portion of said container;

a plurality of individually mounted shock mounts extending from said frame member interiorly thereof in spaced relationship;

means attached to said shock mounts for supporting equipment; and wherein,

said shock mounts extend interiorly to place at least a portion thereof under a bending moment.

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**4,712,686**

**POWER ASSISTED ROLLER-STRETCH APPARATUS AND PROCESS**

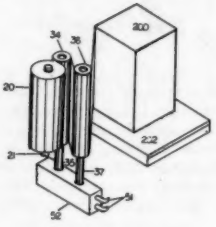
**Patrick R. Lancaster, Anchorage, and William G. Lancaster, Louisville, both of Ky., assignors to Lantech, Inc., Louisville, Ky.**

**Division of Ser. No. 184,787, Sep. 8, 1980, Pat. No. 4,387,548, which is a continuation-in-part of Ser. No. 96,384, Nov. 21, 1979, Pat. No. 4,302,920. This application Dec. 11, 1980, Ser. No. 215,250**

**The portion of the term of this patent subsequent to Dec. 1, 1998, has been disclaimed.**

**Int. Cl.[4] B65D *19/38***

**U.S. Cl. 206—597** **9 Claims**



1. A pallet load comprising a plurality of articles in a predetermined stacked array wrapped with at least two substantially superimposed wraps of a plastic film web stretched above 100 percent and beyond its yield point, said web being wrapped ont he pallet load with a first containment force, said containment force substantially increasing through the passage of time after the pallet has been wrapped until the containment force on the load is at least ten percent greater than the original containment force.

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**4,712,687**

**COLLAPSIBLE PALLET CONTAINER AND MULTI-WALL FIBREBOARD CONTAINER THEREFOR**

**Terry L. Silcott, Hicksville, Ohio, and Dale T. French, South Lyon, Mich., assignors to Weyerhaeuser Company, Tacoma, Wash.**

**Filed Jul. 8, 1986, Ser. No. 883,340**

**Int. Cl.[4] B65D *19/00***

**U.S. Cl. 206—600** **16 Claims**

1. A container for mounting on the top of a pallet, comprising:

a first side panel having top and bottom edges and first and second side edges;

a first end panel having top and bottom edges, a first side edge connected along a score line to said second side edge of said first side panel, and a second side edge;

a second side panel having top and bottom edges, a first side edge connected along a score line to said second side edge of said first end panel, and a second side edge;

a second end panel having top and bottom edges, a first side edge connected along a score line to said second side edge of said second side panel, and a second side edge con-

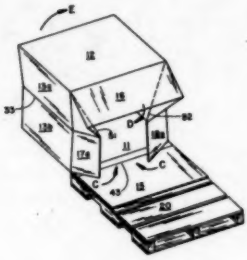
nected along a score line to said first side edge of said first side panel;

a first bottom length flap connected along a score line to said bottom edge of said first side panel and being adapted to be connected to the top of a pallet, said first bottom length flap having first and second side edges;

a first bottom width flap connected along a score line to said bottom edge of said first end panel, said first bottom width flap having a first side edge which is free from but adjacent to said second side edge of said first bottom length flap to define a slot therebetween, and a second side edge;

a second bottom length flap connnected along a score line to said bottom edge of said second side panel, said second bottom length flap having a first side edge connected along a score line to said second side edge of said first bottom width panel, and a second side edge; and

a second bottom width flap connected along a score line to said bottom edge of said second end panel, said second bottom width flap having a first side edge connected along



a score line to said second side edge of said second bottom length flap and a second side edge free from but adjacent to said first side edge of said first bottom length flap;

means for connecting said first and second side panels and said first and second end panels defining a container space therebetween;

each of the first and second end panels with their connected respective first and second bottom width flaps, having a central score line extending from the top edges of said first and second end panels through said first and second bottom width flaps, whereby said end panels and bottom width flaps are foldable inwardly of the container space along each central score line;

one-half of each bottom width flap between said central score line and said second bottom length flap having a diagonal score line extending from said second bottom length flap to an end of said central score line on said bottom width flap, whereby said half is foldable inwardly of the container space along the diagonal foldline.

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**4,712,688**

## DOUBLE BREAKAPART CARTON WITH SEALABLE ENDS AND BLANK FOR FORMING THE SAME

**Herbert L. Lambert, West Chicago, Ill., assignor to Waldorf Corporation, St. Paul, Minn.**

**Filed Mar. 13, 1985, Ser. No. 711,285**
**Int. Cl.[4] B65D 5/54**
**U.S. Cl. 206—602** **16 Claims**

1. A carton formed from a foldable blank, comprising:

a plurality of sides defining a tube, said tube and sides having first and second ends;

end flaps coupled to said sides and closing said tube ends;

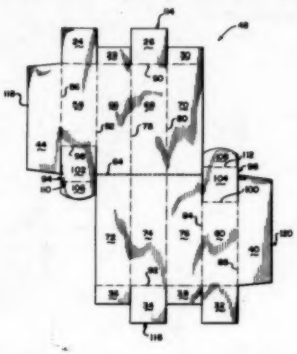
first and second intermediate closure flaps formed in and hingedly coupled to one of said side along separate intermediate closure fold lines that span said side between the ends of said side, said intermediate closure flaps extending from and being foldable at their respective intermediate closure fold lines to lie substantially perpendicular to said one side; and

a common perforated line in the remaining sides intermediate the ends of said remaining sides and adjacent said intermediate closure flaps, the plane of said common perforated line being distinct from either intermediate closure fold line associated with an intermediate closure flap;

whereby, the remaining sides can be separated along said common perforated line, forming two additional open tube ends each of which is fully closeable by one of said intermediate closure flaps when said flaps are folded to lie substantially perpendicular to said one side and each of which is open when said intermediate closure flaps are positioned to lie in the plane of said one side.

9. A unitary blank formed of paperboard and adapted to be folded into a carton, comprising:

a first full length panel;



second and third full length panels hingedly coupled to opposite sides of said first full length panel along fold lines;

a lateral weakened line in said full length panels dividing each of said full length panels into top and bottom half panels;

a first and a second partial panel hingedly coupled to said second and third full length panels, respectively, at longitudinal fold lines opposite said first full length panel, said first partial panel being laterally adjacent said top half panel of said second full length panel and said second partial panel being laterally adjacent said bottom half panel of said third full length panel; and

first and second intermediate closure flaps hingedly coupled to said first and second partial panels,

respectively, at intermediate closure fold lines perpendicular to said longitudinal fold lines and parallel to each other along an edge of said partial panels.

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**4,712,689**

## ICE-CREAM CARTON, CARTON BLANK, AND METHOD OF ERECTING SAME

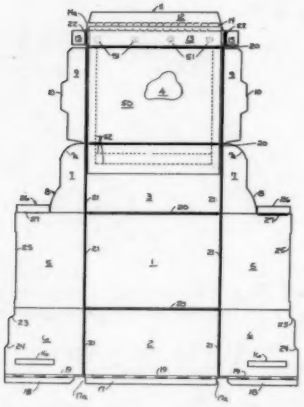
**Thomas W. Froom, 10 Burncoat Way, Pittsford, N.Y. 14534**

**Continuation-in-part of Ser. No. 866,890, May 23, 1986, Pat. No. 4,712,730. This application Apr. 14, 1987, Ser. No. 38,368**
**The portion of the term of this patent subsequent to Dec. 15, 2004, has been disclaimed.**
**Int. Cl.[4] B65D 5/54**
**U.S. Cl. 206—626** **31 Claims**

1. In an integral carton blank, adapted to be erected into a carton, said carton blank having a bottom panel, a front panel hingedly connected to said bottom panel, a rear panel hingedly connected to said bottom panel, a cover panel hingedly connected to said rear panel, and a cover panel front flap comprising tear-away means connected to said cover panel

and adapted to overlap said front panel and to be releasably secured thereto in the erected carton, said bottom panel having end flaps hingedly connected thereto, said rear panel having end flaps hingedly connected thereto, said front panel having end flaps hingedly connected thereto, said cover panel having end flaps hingedly connected thereto, and said cover panel front flap having end posts hingedly connected thereto, said bottom panel, front panel, and rear panel end flaps being adapted to be folded in to form end walls in the erected carton, and said cover panel front flap end posts being adapted to overlie said cover panel end flaps and to be secured thereto in the erected carton to form a skirted cover, the improvement which comprises:

said bottom panel end flaps are adapted to be infolded so as to constitute the inner end walls of the erected carton, said front panel end flaps are adapted to overlie said said bottom panel end flaps in the erected carton, and said rear panel end flaps are adapted to overlie said bottom panel end flaps and to overlap said front panel end flaps in the erected carton,



said bottom panel end flaps are full end flaps having an area adapted essentially to close an open end of a carton erected from said blank,

said bottom panel end flaps have a recess along a major portion of an outer marginal edge thereof adapted to underlie the cover panel in the erected carton and of a depth corresponding generally to the thickness of the material of construction of said carton blank,

said front panel end flaps are adapted to overlie a major area of the bottom panel end flaps in the erected carton and have, along an edge thereof adapted to be an upper edge thereof in the erected carton, a lip extending along a major portion of the reach thereof and adapted to coincide with said recess in said outer marginal edge of said bottom panel full end flaps in a closed carton erected from said blank, and

said rear panel end flaps being adapted to overlie a minor area of said bottom panel full end flaps and to overlap said front panel ends flaps and to be secured thereto by single lines of adhesive extending from the bottom of the rearwardmost edges of said front panel end flaps along the edges thereof up to the cover panel end flap lower edges as they will be located in the erected carton.

**4,712,690**

## PACKAGE HAVING WELDED SEAM CLOSURE WITH HOT MELT THICKENING

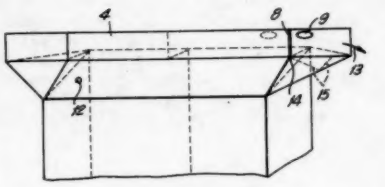
**Benno Stöhr, Hückelhoven, Fed. Rep. of Germany, assignor to PKL Papier-und Kunststoff-Werke Linnich GmbH, Dusseldorf, Fed. Rep. of Germany**

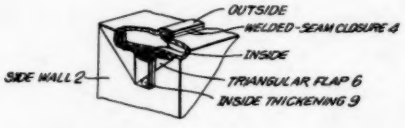
**Continuation of Ser. No. 704,128, Feb. 22, 1985, abandoned. This application Jun. 5, 1986, Ser. No. 873,136**

**Claims priority, application Fed. Rep. of Germany, Feb. 25, 1984, 3406962**

**Int. Cl.[4] B65D 5/70**

**U.S. Cl. 206—628** **15 Claims**




1. In a parallelepipedal package having an upper surface and side walls and made by folding and sealing a scored blank of a sheet material, the package having a welded-seam closure at the upper surface and triangular flaps foldable down against the side walls, the improvement wherein at least one side of the welded-seam closure has a thickening comprising a hot melt coating and having a convex and tacky surface that facilitates ripping into the closure or ripping the closure out.

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**4,712,691**

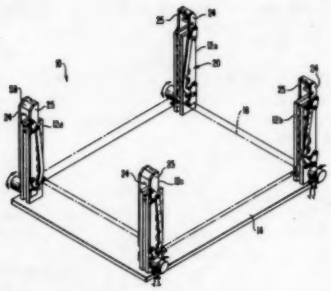
## RACKING DEVICE

**Hans Grill, Filswiesenstrasse 31, 7333 Ebersbach 1, and Gerhard Tappen, Johann-Sebastian-Bach Str. 12, D732 Wangen, both of Fed. Rep. of Germany**

**Filed Oct. 14, 1986, Ser. No. 918,121**

**Int. Cl.[4] A47F 5/00**

**U.S. Cl. 211—49.1** **19 Claims**



1. A device for stacking finished parts comprising:

a frame formed from a plurality of latch columns secured to a base member to define a space intermediate the latch

columns for receiving finished articles in a spaced, stacked array;

a plurality of lever arms pivotably secured to said latch column and spaced vertically therealong, each of said lever arms having a receiving portion and an oppositely-extending weighted arm angularly disposed relative to said receiving portion, said lever arms being pivotably connected to said latch column so that each of said lever arms is capable of assuming (a) a rest position, wherein each of said receiving portion and said weighted arm are free from said space; (b) a receiving position, wherein said receiving portion is located within said space in a position ready to receive an article thereon within said space; and (c) a loaded position, an adjacent pair of said latch arms cooperating so that a loading of an article on said receiving portion of a lower latch arm causes said lower latch arm to pivot from its receiving position to its loaded position and thus to cause a pivoting of the next uppermost latch arm from its rest position to its receiving position, the weighted arms of the respective latch arms being in sliding contact;

each of said latch arms including a retaining arm located intermediate said receiving portion and said weighted arm to define with said receiving portion a recess for securing an end of said stacked article in said recess when said latch arm rotates from its receiving to its loaded position.

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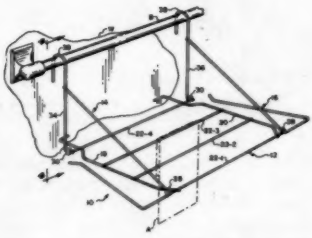
**4,712,692**

## STOWABLE SHELF/RACK ASSEMBLY

**Alice A. Peinsipp, Westchester, Ill., assignor to Selfix, Inc., Chicago, Ill.**

**Filed Mar. 6, 1987, Ser. No. 22,672**
**Int. Cl.[4] A47F 5/08**
**U.S. Cl. 211—119** **11 Claims**



1. A stowable shelf/rack assembly comprising:

a rack member for supporting articles placed thereon or hung therefrom; and

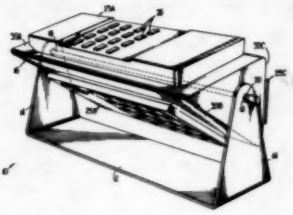
hanger means connected to either side of said rack member, and pivotable between a first position in which said hanger means are oriented generally transverse to said rack member, and a second position in which a major portion of said hanger means lies generally in the same plane as and rests on said rack member, said hanger means including a first hook portion extending rearwardly of the assembly and adapted when said hanger means is in said first position to hang on and be supported by a bar or other member affixed to and spaced from a substantially vertical planar surface, and a second hook portion integral with said first hook portion and extending rearwardly from a point adjacent the front of the assembly and engageable when said hanger means is in said second position with a substantially horizontal planar support member for supporting the collapsed assembly in close contact with one substantially horizontal surface thereof for stowage.

**4,712,693**

## REMOTE CONTROL UNIT CONSOLE

**James W. Striplin, 10095 Kinross Rd., Roswell, Ga. 30076**

**Filed Jul. 14, 1986, Ser. No. 885,198**
**Int. Cl.[4] A47F 5/02**
**U.S. Cl. 211—164** **15 Claims**



1. A device for supporting remote control units which emit activating beams, comprising:

a base;

a remote control unit mount rotatably mounted about a first axis relative to said base, including means for supporting a plurality of remote control units; and

connecting means operably associated with said base and said remote control unit mount so that said remote control unit mount may be rotated about said axis relative to said base so that said remote control units may be selectively activated to emit triggering beams along axes substantially parallel to said first axis without movement of said base.

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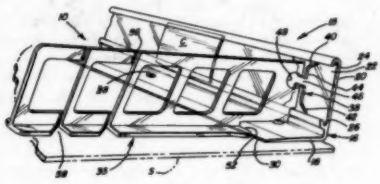
**4,712,694**

## DISPLAY SHELF ORGANIZER

**David Breslow, Chicago, Ill., assignor to RTC Industries, Inc., Chicago, Ill.**

**Filed Nov. 10, 1986, Ser. No. 929,053**
**Int. Cl.[4] A47F 5/00**
**U.S. Cl. 211—184** **7 Claims**



1. A shelf organizer comprising:

an elongated rail member having a bottom mounting portion and an upper portion extending upwardly from the mounting portion, said mounting and upper rail portions together defining a generally L-shaped cross-section for said rail member, said mounting portion being attachable to an upper surface of a shelf;

channel means comprising a top rail and an opposed bottom rail integrally formed on an inner surface of said upper rail portion wherein said top rail is generally coextensive with the upper edge of said upper rail portion, and wherein said bottom rail is generally coextensive with the lower extend of said upper rail portion; and

an elongated divider member comprising an elongated panel and having resilient connector means integral with a front edge thereof, said connector means including vertically spaced upper and lower flange means respectively positionable in said top and bottom rails, said panel being configured to permit said upper and lower flange means to be resiliently compressed toward ech other so that said flange means are snap fittable in said channel means to

operationally mount said divider member in a substantially vertical orientation and perpendicular to said rail portion, whereby said divider member substantially spans the vertical extent of the upper rail portion.

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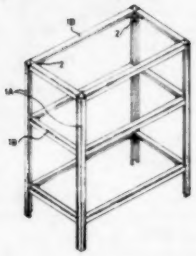
**4,712,695**

## STRUCTURAL FRAME CONNECTOR

**Huey-Der Cheng, 343 Fu Hsing South Rd., Sec. 2, Taipei, Taiwan**

**Filed Jul. 25, 1986, Ser. No. 889,396**
**Int. Cl.[4] A47B 47/00**
**U.S. Cl. 211—191** **7 Claims**



1. The assembly rack comprising:

a plurality of upright posts each comprising angularly related sides having longitudinal guide edges, said sides defining an inner surface of said post;

a plurality of lateral joining rods each comprising angularly related sides having longitudinal guide edges, said sides of said joining rod defining an inner surface of said joining rod; and

a plurality of structural connectors each joining at least one joining rod to an upright post, said structural connectors each comprising:

a body having at least two branch arms disposed at an angle relative to one another, one said branch arm including a pair of first guide slots for receiving said guide edges of a respective upright post such that said one branch arm can be assembled into said upright post, the other of said branch arms including a pair of second guide slots for receiving said guide edges of a respective joining rod such that said joining rod can be assembled onto said other branch arm,

a friction block mounted on each of said branch arms and arranged to face said inner surface of a respective post and joining rod when said branch arms are assembled to said post and joining rod, and

threaded bolts operably connected to said branch arms and their respective friction blocks for moving said friction blocks independently of one another and away from said branch arms into frictional contact with said inner surfaces of said post and joining rod to frictionally lock said branch arms between said inner surfaces and said guide edges of their respective post and joining rod.

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**4,712,696**

## KNOCKDOWN STORAGE RACK WITH WEDGE CONNECTORS

**Herbert H. Klein, Arlington Heights, Ill., assignor to Unarco Industries, Inc., Chicago, Ill.**

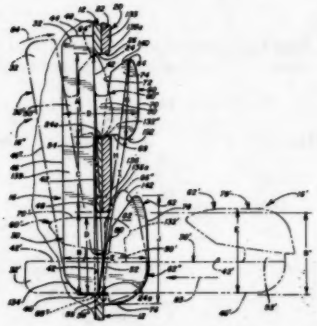
**Filed Jan. 15, 1987, Ser. No. 4,336**
**Int. Cl.[4] A47B 47/00**
**U.S. Cl. 211—192** **18 Claims**

1. A wedge connector in combination with a knockdown storage rack that includes a hollow, upright, post having an inside, an outside and at least one pair of vertically aligned, vertically oriented, spaced, elongated slots in the wall of said post, the upper slot of said pair having a first predetermined length, the lower one having a second predetermined length, the two slots of said pair being spaced apart vertically a third predetermined distance, said rack further including a horizontal cross beam that terminates in a support plate matingly related to the exterior surface of said post, said support plate defining a vertically oriented elongated slot of substantially the same shape and dimensions as said upper elongated slot in said post wall, the bottom edge of said vertical elongated slot in said cross beam support plate being spaced above the bottom edge of the support plate a distance equal to said third predetermined distance, which wedge connector comprises:

(a) a flat, elongated shank spanning said lower post slot, the portion of the post wall lying between said two post slots, and at least a portion of the upper one of said two post slots, the median plane of said shank being perpendicular to the respective planes tangent to the surfaces of the wall of said hollow post and of said mating support plate in the area adjacent said elongated slots in said post and said support plate,

said elongated shank having a width, a bottom edge, an inner edge, an upper edge and an outer edge, the inner edge of said shank abutting the inner surface of said post wall, and the outer edge of said shank being remote from said post wall;

(b) two ear-supporting members extending laterally from said inner edge of said elongated shank, one for each slot of said pair of post slots, said ear-supporting members being disposed one above the other; and



(c) a wedging ear supported by each of said laterally extending members, said two ears being disposed one above the other, with a free end of each of said ears being directed upward, each of said ears having a bottom edge, an outer side edge, an upper edge located at the free end of the ear, and an inner edge adjacent the upper portion of said ear, the lateral dimension of said connector adjacent the upper end thereof, comprising the widths of said shank, said upper ear-supporting member and said upper ear, being slightly less than said second predetermined length of said lower post slot such that said upper end of said wedge connector, with said wedging ears pointed upward and the longitudinal axis of said elongated shank generally perpendicular to the lower one of said two elongated post slots, is inserted from outside the post into said lower post slot, the lateral dimension of said connector adjacent the lower end therof, comprising the widths of said shank, said lower ear-supporting member and said lower ear, being slightly more than said second predetermined length of said lower post slot such that said lower end of said wedge connector can not pass through said lower elongated post slot during said upper end portion of said wedge connector into said lower post slot

the shape and dimensions of the lower portion of said elongated shank and the shape, dimensions, and location on said shank of said two wedging ears being such that, after said

upper wedging ear has been inserted in said lower elongated post slot while said cross beam support plate is matingly engaged with said post wall and said upper post slot and said support plate slot are aligned with each other, the upper end portion of said elongated shank is pivoted within said lower elongated post slot upward about the lower end portion of said shank and the highest point on said upper edge of said upper wedging ear is moved to a position just within said upper elongated slot in said post wall,

the shape, dimensions, and location on said elongated shank of said upper wedging ear being such that the highest point on said upper edge of said wedging ear continues to fall below the top edge of said upper elongated post slot as said upper end portion of the wedge connector is pivoted farther beyond the position in which said upper ear lies just within said upper post slot, the shape and dimensions of said upper wedging ear being such that said ear passes, after the wedge connector has been pivoted as just described, entirely through said aligned slots in said post wall and said cross beam support plate,

said inner edge of each of said upper and lower wedging ears having a first inclined surface that is inclined away from said shank in the upward direction towards the free end of the ear, with the bottom portion of said inner edge of the ear being spaced from said inner edge of said shank a distance less than the combined thickness of said cross beam support plate and the wall of said post, to provide a wedging surface to confine (i) the portion of said support plate that lies immediately above said elongated slot in said plate, and (ii) the portion of said support plate that lies immediately above said bottom edge of the plate, respectively, when said support plate slot is aligned with said upper post slot, said upper wedging ear is inserted in the lower elongated post slots and pivoted as aforesaid to pass the upper wedging ear through said aligned slots, and the support plate is moved downward,

whereby portions of said support plate above the confined portions just mentioned are urged against the outer surface of the wall of said upright post, and said inner edge of said shank is urged against the inner surface of the wall of said upright post, thereby connecting said support plate and its associated cross beam securely to the post.

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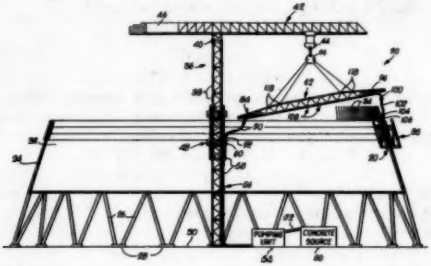
**4,712,697**

## LIGHTWEIGHT TOWER CRANE BOOM FOR CONVEYING PUMPED CONCRETE

**Joseph L. McGowan, Harpenden, England, assignor to The Marley Cooling Tower Company, Mission, Kans.**

**Filed Jul. 22, 1986, Ser. No. 888,118**
**Int. Cl.[4] E04B *11/16***
**U.S. Cl. 212—189** **5 Claims**



1. In an apparatus for lifting flowable concrete mix to an elevated height for introduction into a form system, wherein said apparatus includes a concrete pumping means having discharge piping, and crane means with an upright tower and an elongated jib carried by the tower and swingable about the upright axis of said tower, a lightweight boom at least partially supported by said jib for conveying concrete mix from said discharge piping of said concrete pumping means to said form system, said boom comprising:

a first elongated upper member,

a second elongated upper member disposed in horizontally spaced, side-by-side, generally parallel relationship to said first member;

a number of elongated brace members each fixedly interconnecting said first upper member and said second upper member at spaced locations along the lengths of said first and second upper members;

a first plurality of elongated spacer bars each having an upper end portion secured to said first upper member at spaced locations along the length of the latter; a second plurality of elongated spacer bars each having an upper end portion fixed to said second upper member at spaced locations along the length of the latter;

an elongated bottom member disposed below said first upper member and said second upper member in spaced, generally parallel relationship to said first upper member and said second upper member,

each of said first plurality of bars and each of said second plurality of bars extending downwardly toward said bottom member and having a lower end portion fixedly connected to said bottom member,

said boom presenting a substantially triangular configuration in a cross-section transverse to the longitudinal axis of said bottom member,

said bottom member having walls defining a longitudinally extending, concrete conveying conduit; and

means for joining the conduit to said discharge piping of said pumping means to permit concrete mix from said pumping means to be directed along the length of said boom for introduction into said form system,

said boom and thereby the conduit therein being of extensible length to enable concrete mix to be directed to said form system at selectively variable distances from the center of said tower.

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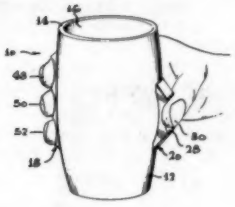
**4,712,698**

## DRINKING VESSEL

**Herbert S. Greenberg, 21 Via Marina #2, Marina del Rey, Calif. 90290**

**Filed Feb. 28, 1986, Ser. No. 834,569**
**Int. Cl.[4] B65D *23/10***
**U.S. Cl. 215—100 A** **18 Claims**



1. A drinking vessel comprising:

walls defining a closed side, closed bottom and open top vessel;

first and second opposed handle portions positioned on substantially opposite sides of said vessel, each of said handle portions having an external digit engagement surface and being secured to said vessel for manual engagement of said vessel by grasp of both of said handle portions within the digits of the same hand, said handle portions each having at least one digit-receiving depression on the outer surface thereof so that manual grasp of said drinking vessel and digit engagement of said handle portions comprises digit engagement in said depression; and

insulation of a different material than said vessel between said engagement surface and said vessel.

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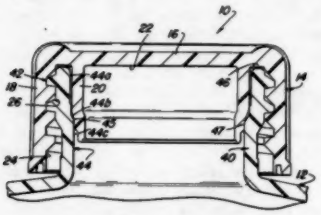
**4,712,699**
**PACKAGE EMPLOYING UNIQUE SEAL**
**Michael Lutz, Watchung, N.J., assignor to Captive Plastics, Inc., Piscataway, N.J.**
**Filed Oct. 2, 1986, Ser. No. 914,384**
**Int. Cl.[4] B65D *53/00***
**U.S. Cl. 213—329** **6 Claims**



1. A package including a container and a closure, said container being a unitary, molded plastic member including an upper elongate finish having outer and inner surfaces, threads on the outer surface adjacent the upper margin of said finish, said inner surface having a lower sealing section located solely in a section of the finish spaced downwardly from said upper margin; said closure including an upper surface, an outer skirt extending downwardly from the upper surface and having threads on the inner surface thereof for threadedly engaging the threads on the finish, and an inner valve spaced concentrically within the outer skirt and extending axially downward from the upper surface of said closure, said inner valve having an outer surface for frictionally engaging only the lower sealing section of the inner finish surface in a region for creating a leak-proof seal between said container and closure; the outer surface of the finish opposite the region of frictional engagement between the inner valve member of the closure and the container being free of threads.

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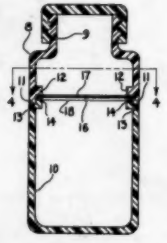
**4,712,700**
**TAMPER RESISTANT BOTTLE**
**Harry H. Fischman, 9436 Kostner Ave., Skokie, Ill. 60076**
**Filed Dec. 2, 1986, Ser. No. 937,078**
**Int. Cl.[4] B65D *55/02, 53/04***
**U.S. Cl. 215—366** **7 Claims**



1. A tamper resistant bottle, comprising a bottle or container of plastic or other suitable material, a first means adapted to form said bottle in, but not limited to, two sections, a second means to connect said sections, one to the other, a third means to permanently bond said connected sections, each to the other, said unit further including means adapted to form configurations and projections on the inside periphery of said tamper resistant bottle, to receive and to position one or more safety seals, bonding means to permanently bond said safety seals to said configurations and projections, in said tamper resistant bottle.

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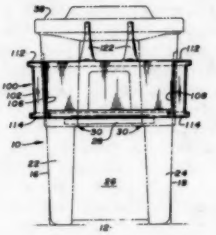
**4,712,701**
**SUPER-ELLIPTICAL ADAPTOR RING FOR REFUSE CONTAINERS AND THE LIKE**
**Martin J. Durkan, Jr., 3000 Lind Ave. SW., Renton, Wash. 98055**
**Filed Sep. 15, 1986, Ser. No. 906,968**
**Int. Cl.[4] B65D *6/34***
**U.S. Cl. 220—71** **15 Claims**



1. For use with a substantially rectangular container having planar exterior walls tapering inwardly toward a lower portion of said container and defining a substantially rectangular horizontal cross-section therethrough, a ring-like adaptor for adapting the container to be handled by a robotic manipulator of substantially cylindrical objects, said adaptor comprising:
(a) a smoothly curving outer surface having a horizontal cross-section substantially in the form of a super-ellipse;
(b) substantially planar inner mating surfaces for frictionally engaging and mating with the exterior walls of an upper portion of the container, said inner mating surfaces defining a substantially rectangular horizontal cross-section therethrough, such that the adaptor is removably mountable on the container by sliding said adaptor upwardly from the lower portion of the container until the inner mating surfaces of the adaptor are frictionally arrested by the exterior walls of the container to prevent further upward movement of the adaptor; and
(c) locking means for positively securing the adaptor in position around the upper portion of the container to prevent downward movement of the adaptor toward the lower portion of the container both when the container is upright and when the container is inverted.

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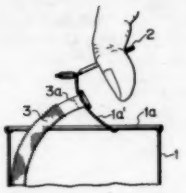
**4,712,702**
**CONTAINERS FOR BEVERAGES**
**Youzou Ayabe, Imperial Roppongi 406, 16-5, Roppongi 5-chome, Minato-ku, Tokyo, and Shigeru Sugiyama, 8-7, Kugenumakaigan 3-chome, Fujisawa-shi, Kanagawa-ken, both of Japan**
**Filed Oct. 23, 1986, Ser. No. 922,222**
**Int. Cl.[4] A47G *21/18, 19/22;* B65D *47/04***
**U.S. Cl. 220—90.2** **1 Claim**

1. A container for beverages comprising
a housing;
a straw in said housing;
a removable opening portion on the top of said housing forming an opening in said housing upon removal of said opening portion from the top of said housing;
said straw including
an upper end mounted in a caulked attachment to said removable opening portion and extending from the rear side of said removable opening portion;
a cut-off portion in the vicinity of said upper end of said straw;

a body portion formed into a bellows adapted to be extensible;

a stopper formed as a float and attached at a lower portion of said straw;

said stopper being larger in size than said opening in said housing formed by removal of said removable opening




portion to prevent passage of said stopper through said opening

whereby said straw may be pulled to extend it in its bellow body portion while its bottom end is held within said opening in said housing to provide the opposite force to the force applied for extending the length of said straw.

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**4,712,703**

**PERFECTED CAP, PARTICULARLY FOR MOTOR VEHICLES**

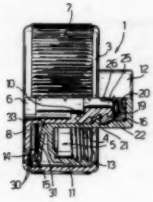
**Manrico Oddenino, Via Reano, Italy, assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Filed May 12, 1986, Ser. No. 861,719**

**Claims priority, application Italy, May 21, 1985, 53410/85[U]**

**Int. Cl.[4] B65D *55/14***

**U.S. Cl. 220—210** **2 Claims**




1. A locking safety cap for a threaded filler neck comprising:

an outer shell member having a cup-shaped portion and an integral hollow shank portion, said cup-shaped portion having a circular base section and an integral annular flange section, said hollow shank portion having exterior threads on its outer end,

an inner closure member rotatably slidingly retained within said outer cap member and having threads to engage and close said filler neck, said closure member having a hollow cylindrical sleeve portion slidably disposed over the outer end of said hollow shank portion of said outer shell member,

a cylindrical shaped control member rotatably slidably retained within said hollow cylindrical sleeve portion of said inner closure member and having internal threads in threaded engagement with said exterior threads on the outer end of said hollow shank portion of said outer sleeve member, where said control member allows said outer shell member to be moved axially relative to said inner closure member between a locked and an unlocked portions,

lock means mounted inside said hollow shank portion of said outer shell member for selectively interlocking said control member in a manner that turning said lock means causes said outer shell member to move from said locked position to said unlocked position,

a first saw-tooth ring gear half being formed on the inside surface of said circular base section of said cup-shaped portion of said outer shell member and a second saw-tooth ring gear half flexably supported by said cylindrical sleeve portion of said inner closure member in a manner to be in a mating relationship with said first sawtooth gear half whenever said outer shell member is in said locked position and disengaged whenever said outer shell member is in said unlocked position.

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**4,712,704**

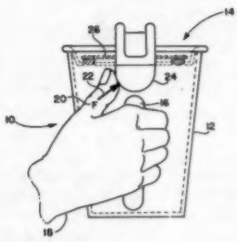
**SELF-SEALING CLOSURE**

**Douglas P. Ramsey, 154 Fiesta Rd., Rochester, N.Y. 14626, and Michael J. O'Brien, 106 Meadow Farm N., North Chili, N.Y. 14514**

**Filed Feb. 19, 1987, Ser. No. 16,345**

**Int. Cl.[4] B65D *51/18*; A47G *19/22***

**U.S. Cl. 220—254** **16 Claims**




1. A self-sealing closure for a drinking vessel with a receptacle, said closure comprising (a) a lid having a depressed area and at least one orifice within the depressed area; (b) a shutter matching said orifice; (c) means for resiliently holding the shutter against said orifice; and (d) means rotating within a plane perpendicular to the central axis of said receptacle and lid for pushing the shutter away from said orifice in a direction substantially orthogonal to the plane of said orifice, wherein:

(e) said shutter is normally in a closed position in which the passage of fluid through it is prevented;

(f) said shutter can be moved from its closed position to an open position by the application of an external force, which need not exceed about 2.8 ounces, applied along the perimeter of the shutter within a plane perpendicular to the central axis of the shutter; and

(g) when said external force ceases to be applied to the shutter, the shutter spontaneously returns to its closed position.

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**4,712,705**

**TAMPER INDICATING CAP SEAL FOR CONTAINER VALVES**

**Charles Fuehrer, Scarsdale, N.Y., assignor to Stoffel Seals Corporation, Tuckahoe, N.Y.**

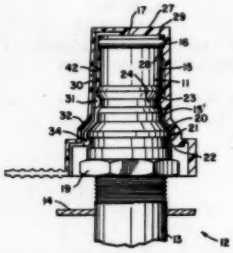
**Filed Jan. 30, 1987, Ser. No. 8,944**

**Int. Cl.[4] B65D *51/16***

**U.S. Cl. 220—270** **8 Claims**

1. A cap seal for use in covering and preventing undetected removal of a valve plug having a generally cylindrical wall on a container, the valve plug having an end face, an O-ring just below the end face extending radially beyond the contiguous surface of the plug, and a base portion with wrench engageable surfaces extending radially beyond the contiguous surface of the plug, comprising a body having a generally cylindrical side wall, a closed end wall and an open end, said body being of a size approximately to engage the O-ring, said body having protrusion means adjacent to its end wall and, when the seal is mounted on the plug, extending inwardly beneath the O-ring and proximate to said plug wall, a skirt portion depending from

said body and being joined thereto by frangible connecting means and having a wall portion with an integrally formed tear strip which is separable from said skirt portion along spaced frangible lines, said wall portion being substantially parallel to said side wall and overlying a least a portion of said wrench engageable surfaces, said tear strip extending along the height of the side wall and the skirt portion and being separable from said side wall along spaced frangible lines which extend along



said side wall and formed by internal grooves therein, said grooves permitting air to escape from inside the cap and past the O-ring when it is applied to a plug, and pull tab means extending from said tear strip, whereby said tear strip may be severed along said frangible lines in order to remove said cap from the valve plug, and whereby undetected removal and replacement of said cap seal or manipulation of said wrench engageable surfaces is prevented.

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**4,712,706**

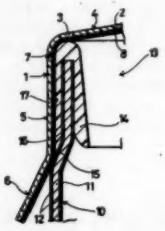
**EASY OPEN TYPE CAN**

**Akira Nakata, Ageo; Shiroh Matsumoto; Hitoshi Tozima, both of Kasukabe, and Masahiko Minato, Iwatsuki, all of Japan, assignors to Hokkai Can Co., Ltd., Tokyo, Japan**

**Filed Jan. 20, 1987, Ser. No. 4,645**

**Int. Cl.[4] B65D *41/32***

**U.S. Cl. 220—276** **4 Claims**



1. An easy open type can comprising:

a can closure including a top panel having a peripheral wall portion extending downwards from a circumferential edge of the top panel portion thereof;

a tab for opening the closure;

a score line constructed in the peripheral wall portion so as to be connected to an end of one side edge of the tab and extending over the whole circumference of the peripheral wall portion;

said peripheral wall portion is mounted on and fixed to an open end portion of a can barrel;

said can closure is formed of a metallic foil and a thermoplastic resin layer covering an outer surface of the metallic foil and the score line is constructed by removing only the resin layer of the peripheral wall portion of the can closure, and the score line is provided in such a region of the peripheral wall portion that is adhered to the open end portion of the can barrel.

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**4,712,707**

**CLOSURE FOR A CONTAINER**

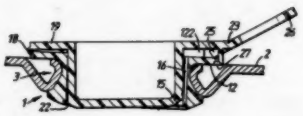
**Andrew P. Pavely, Blunsdon, United Kingdom, assignor to Metal Box p.l.c., Reading, England**

**Filed Sep. 9, 1986, Ser. No. 905,185**

**Claims priority, application United Kingdom, Sep. 9, 1985, 8522284**

**Int. Cl.[4] B65D *39/00***

**U.S. Cl. 220—307** **15 Claims**



1. A closure for a container having an opening therein which includes a frusto-conical closure-engaging surface which flares outwardly into the container, the closure comprising:

a relatively elastic annular collar which is an easy fit in the opening in the relaxed state and consists of a substantially cylindrical neck located in the opening, a radial flange connected to the neck of the collar at its end outside the container, and a thickened portion connected to the neck of the collar at its end within the container and which in the relaxed state flares both inwardly and outwardly from the neck of the collar;

and a relatively stiff plug hingedly connected to the collar which is inserted into the collar to close the opening and engages the thickened portion of the collar and causes it to be elastically deformed into tight sealing engagement with the frusto-conical closure engaging surface of the opening and with the plug.

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**4,712,708**

**CAP MOUNTING STRUCTURE OF THE GOVERNOR VALVE FOR AUTOMATIC TRANSMISSION**

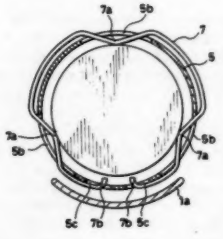
**Hiromi Taguchi, Zama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Apr. 9, 1986, Ser. No. 849,714**

**Claims priority, application Japan, Apr. 17, 1985, 60-57355[U]**

**Int. Cl.[4] B65D *45/32***

**U.S. Cl. 220—319** **5 Claims**



1. A cap mounting structure for a transmission comprising:

a casing provided in the transmission and having an outer flange formed in the periphery of the casing;

cap means disposed on the casing and having a skirt section which downwardly extends beyond the outer flange and has a plurality of holes and a pair of openings located below the outer flange; and

a snap ring means having a plurality of inwardly protruding portions each inwardly protruding into one of the holes, each end of the snap ring means being inwardly bent and inserted into one of said pair of openings of the skirt section of the cap means, said inwardly protruding portions of said snap ring and said ends of the snap ring means engaging with the skirt section of the cap means, and said ends of the snap ring means engaging with said outer flang of the casing to prevent the snap ring means from circumferentially rotating beyond a predetermined range.

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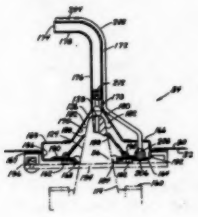
**4,712,709**

## FUEL-INTAKE DEVICE FOR VEHICLE TANK

**Ronald F. Horvath, and Barbara L. Horvath, both of 4325 Kennedy Dr., #204, Racine, Wis. 53404**

**Filed Apr. 28, 1986, Ser. No. 856,172**
**Int. Cl.[4] B67D *5/04***
**U.S. Cl. 220—334** **20 Claims**



1. In a vehicle fuel tank of the type having a substantially flat bottom wall, an opposed top wall, and fuel intake means, the improvement in the fuel intake means comprising:

spaced upper and lower barrier walls having edge portions joined together and to the flat bottom wall;

lower and upper openings in the lower and upper barrier walls, respectively; and

a standpipe having a proximal end beginning at and secured to the upper barrier wall about the upper opening and extending upwardly to a distal end adjacent to the top wall of the tank, the distal end having fuel outlet means therein.

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**4,712,710**

## ONE-PIECE SEAMLESS ENCLOSURE AND METHODS OF MAKING IT

**Richard B. Freeman, Wilmington, Del.; Charles W. Goetz, Willingboro, N.J., and Walter S. Eggert, Jr., Huntington Valley, Pa., assignors to The Budd Company, Troy, Mich.**

**Continuation of Ser. No. 663,626, Oct. 22, 1984, abandoned. This application Feb. 27, 1987, Ser. No. 19,849**
**Int. Cl.[4] B65D *25/18***
**U.S. Cl. 220—414** **1 Claim**

1. A one-piece seamless enclosure comprising:

(a) six panels each including a foam core completely surrounded by fiber reinforced material with one of said panels having an opening therein;

(b) said foam core comprising high density foam foam frames and low density foam material;

(c) each of said panels having mitered edges and being joined together at its edges on adjacent panels to provide a hollow enclosure between said panels;

(d) a "Y" shaped member disposed in corners of said panels to provide rigidity of the panels around said corners, and

(e) said fiber reinforced material completely surrounding the joined panels being impregnated with cured resin to form said one-piece enclosure.

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**4,712,711**

## CONTAINER FOR TRANSPORTING HAZARDOUS CHEMICALS

**Emil J. Geering, Grand Island, and Frank J. Grano, Lewiston, both of N.Y., assignors to Occidental Chemical Corporation, Niagara Falls, N.Y.**

**Filed Mar. 5, 1982, Ser. No. 355,280**
**Int. Cl.[4] B65D *25/14, 51/18***
**U.S. Cl. 220—457** **7 Claims**

1. In a cylindrical metal drum having a protective lining and a removable crown outer lid which is adapted to be secured to the exterior only of said drum, the improvement which comprises:

(a) a rigid high density polyethylene bottle fitted inside said drum, said bottle having two upwardly projecting outlets, one of said outlets serving as a vent for stored chemicals,

(b) an inner lid adapted to be fitted entirely inside said drum on top of said bottle, said inner lid having openings corresponding to said bottle outlets permitting said outlets to extend through said openings,

(c) means for securing said bottle to the inner lid, and

(d) means for securing said inner lid to the interior only of said drum.

7. A method of improving the suitablility of a conventional metallic drum for storing and transporting hazardous chemicals, said method comprising the steps of

(a) inserting a rigid high density polyethylene bottle inside said drum, said bottle having two upwardly projecting outlets, one of said outlets serving as a vent for stored chemicals,

(b) fitting an inner lid entirely inside said drum on top of said bottle, said inner lid having openings corresponding to

said bottle outlets permitting said outlets to extend through said openings,

(c) securing said bottle to the inner lid, and

(d) securing said inner lid to the interior only of said drum.

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**4,712,712**

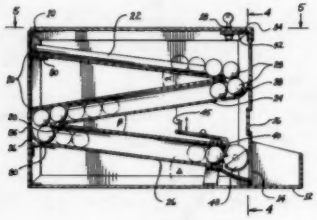
**BALL DISPENSING APPARATUS AND METHOD**

**Robert L. Garden, 1525 W. Cornstock, Chandler, Ariz. 85224**

**Filed Jul. 18, 1986, Ser. No. 888,030**

**Int. Cl.[4] G01F *9/00***

**U.S. Cl. 221—68** **6 Claims**



**1**. A manually operated golf ball dispenser apparatus for simultaneously dispensing a plurality of golf balls, comprising:

a housing member means for housing a plurality of golf balls therein;

a plurality of angularly aligned guide means each arranged in a continuous zig-zag manner for guiding one of said plurality of golf balls out of said housing member means, each of said plurality of guide means having a plurality of golf ball guide members;

a safety flap member means located therebelow said guide member means for blocking off said golf balls when said ball dispenser apparatus is not in use;

a removable cover member means thereabove said housing member means operably attached to said safety flap member means to cause said flap member means to unblock the golf balls on said guide members in response to the action of the cover member means being placed in its closed position;

a holding member means located proximately adjacent the lower end of said guide member means rotatably coupled to an inner frame of said housing member means for holding a number of said plurality of golf balls; and

a manually operated, coin activated dispenser means for operably coupling to said holding member means for simultaneously dispensing said plurality of golf balls that are accumulated from each one of said plurality of guide means.

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**4,712,713**

**GAS CYLINDER COUPLING AND WEIGHTING MECHANISM FOR A CARBONATED DRINK DISPENSER**

**Robert G. Karlis, Fairfield, Conn.; Charles M. Dole, Purdys, N.Y.; Gary L. Webster, Fairfield, Conn., and George J. Andersen, Garrison, N.Y., assignors to Cadbury Schweppes, PLC, London, England**

**Filed Nov. 20, 1985, Ser. No. 799,919**

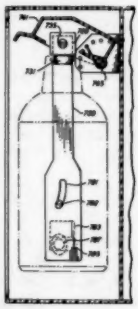
**Int. Cl.[4] B67B *7/24*; G01G *3/00***

**U.S. Cl. 222—3** **27 Claims**

**19**. A mounting and weighing mechanism for a gas cylinder comprising:

(a) a first fitting, said first fitting comprising a cylindrical member containing a passage for conducting gas and having on the outside surface thereof diametrically opposed means for engaging a second mating fitting of a gas cylinder such that the gas cylinder is suspended from said first fitting; and

(b) a weighing mechanism to which said first fitting is attached including: means forming a rotatable lever at the end of which said first fitting is mounted; means for biasing said lever upwardly against the downwardly acting weight of said gas cylinder; and indicator means for indicating the relative position of said second fitting.



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**4,712,714**

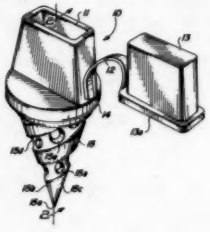
**SEALING SPOUT FOR PAPER CARTONS**

**Domenick Mucciarone, 3645 Boca Ciega Dr., Apt. 206, Naples, Fla. 33942**

**Continuation of Ser. No. 865,460, May 21, 1986, abandoned. This application Jun. 11, 1987, Ser. No. 59,186**

**Int. Cl.[4] B67B *7/26***

**U.S. Cl. 222—91** **4 Claims**



**1**. A device for removing liquid from a sealed paper carton comprising

a pouring spout which is rectilinear in cross section,

a sealing ring surrounding the base of said spout, and

a sharply tipped hollow cone depending axially from said sealing ring having a flat smooth geometrically conical outer surface and a single groove therein which groove spirally extends from the tip of the cone to the underside of the sealing ring and which is concavely arcuate in cross-section.

the flat underside of said sealing ring containing a single annular ring-shaped recess, one side of which is formed by the base of said cone and the other side is formed by the lower edge of the sealing ring, and

the spiral groove in said cone contains a plurality of holes providing passageways from the outside of said cone into the interior of said spout.

4,712,715

## DEVICE FOR INJECTING A FIXING AGENT INTO A DRILLED HOLE FOR ANCHORING A FASTENING ELEMENT INSERTED IN A DRILLED HOLE

Artur Fischer, Weinhalde 34, D-7244 Tumlingen/Waldachtal 3, Fed. Rep. of Germany

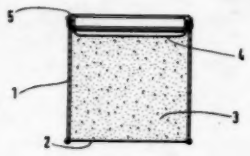
Filed Jul. 7, 1986, Ser. No. 882,636

Claims priority, application Fed. Rep. of Germany, Jul. 6, 1985, 3524289

The portion of the term of this patent subsequent to Sep. 2, 2003, has been disclaimed.

Int. Cl.[4] B65D *25/40;* B67C *3/02*

U.S. Cl. 222—145 3 Claims




1. In a device for injecting a fixing agent into a drilled hole for anchoring a fastening element inserted in said hole, a combination comprising a vessel filled with one component of the fixing agent and sealingly closable with sealing means; a plunger; and an injection nozzle mounted on said plunger, said plunger and said injection nozzle having an overall length which matches a height of an interior of said vessel, the improvement comprising said plunger including an elongated cylindrical sleeve surrounding said nozzle and radially spaced therefrom, said sleeve starting from a base of said plunger and extending along an axis of said nozzle over a substantial portion of a length of said nozzle so as to form between a wall of said sleeve and a wall of said nozzle an annular space filled with another component of said fixing agent, said sleeve having an end face, said end face being sealed with a cover closing said space and having a frangible opening, said plunger with said sleeve and said nozzle being movable into said vessel whereby upon piercing of said frangible opening, said another component from said sleeve is admitted into said vessel filled with said one component and is mixed with said one component to form in said vessel a mixture of said one and another component prior to mounting said plunger-sleeve-nozzle combination on said vessel so that the mixture is discharged from said vessel through said nozzle toward said drilled hole as pressure is applied to said vessel against said plunger and injection nozzle.

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4,712,716

## APPARATUS FOR METERING DUSTING POWDER

Gerhard Schloz, Leinfelden-Echterdingen, and Heinz Weitmann, Rosenfeld, both of Fed. Rep. of Germany, assignors to Weitmann & Konrad GmbH & Co. KG, Leinfelden-Echterdingen, Fed. Rep. of Germany

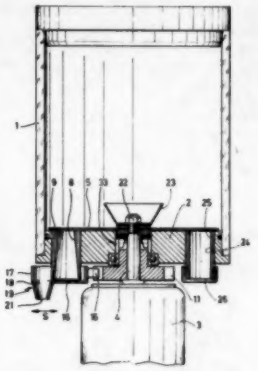
Filed Sep. 8, 1986, Ser. No. 905,324

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1985, 3534090

Int. Cl.[4] B67D *5/58;* G01F *11/00*

U.S. Cl. 222—189 16 Claims

1. Apparatus for metering dusting powder comprising a powder supply container, a powder outlet opening at the bottom of the supply container, a stirring mechanism comprising a stirring blade (5) rotating immediately above the bottom (2) and the outlet opening (8) of the supply container (1), an oscillating plate for metered delivery of the powder provided at the outlet opening, and a shaking device for imparting oscillatory motion to said plate, said shaking device comprising a lever (13) attached to said oscillating plate, a spring (14) for prestressing said lever, and a cam disk (11) for imparting to said




lever an inharmonic oscillatory motion consisting of a slow motion to and a quick motion fro.

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4,712,717

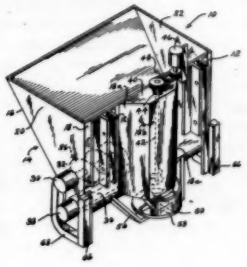
## COMBINED DROP AND BROADCAST SPREADER FOR GRANULAR MATERIAL

Raymond H. Egerdahl, 1208 S. 75th St., West Allis, Wis. 53214

Continuation-in-part of Ser. No. 578,376, Feb. 2, 1984, Pat. No. 4,588,113. This application Mar. 26, 1986, Ser. No. 844,086

Int. Cl.[4] E01C *19/20*

U.S. Cl. 222—252 17 Claims



1. A combined drop and broadcast spreader for granular material comprising:

a hopper for receiving the granular material, said hopper having a bottom containing a plurality of discharge openings for dropping said material, said hopper having a side wall;

wall means mounted on said hopper side wall and forming a chamber on said side wall opening into said hopper;

a rotatable impeller in the bottom of said hopper above said discharge openings for forcing granular material from said openings;

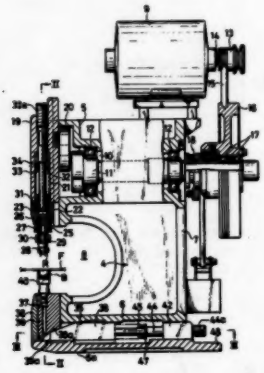
a rotatable broadcast means coupled to said hopper for broadcasting granular material supplied thereto in an arc-like pattern; and

means for selectively supplying granular material from said hopper to said broadcast means, said means comprising a hole in said chamber and rotatable supply means operatively associated with said hole for supplying granular material through said hole to said broadcast means.

## 4,712,718
## APPARATUS FOR ASSEMBLING PAIRS OF FASTENER ELEMENTS

Keiichi Yoshieda, Kurobe, Japan, assignor to Yoshida Kogyo, K. K., Tokyo, Japan

Filed Aug. 13, 1986, Ser. No. 896,063
Claims priority, application Japan, Aug. 16, 1985, 60-179290
Int. Cl.[4] B21J *15/10*
U.S. Cl. 227—62 7 Claims



1. An apparatus for assembling a pair of fastener elements, comprising:

(a) a frame;

(b) a die holder vertically movably mounted on a lower portion of said frame and supporting thereon a die on which one of the fastener elements is supported, said die and said die holder being movable in unison with each other;

(c) a reciprocable ram mounted on an upper portion of said frame in confronting relation to said die and supporting thereon a punch on which the other fastener element is supported, said ram being vertically movable toward and away from said die to clinch the fastener elements together by and between said punch and said die; and

(d) means for adjustably setting a clinching force to be applied to the fastener elements as they are clinched by said punch and said die, said clinching-force setting means including

(1) a downwardly sloping lower surface of said die holer,

(2) a slider block disposed in said lower portion of said frame and slidably movable in a horizontal direction, said slider block having a downwardly sloping upper surface engageable with said sloping lower surface of said die holder,

(3) first spring means for urging said slider block toward said die holder to hold said sloping upper surface and said lower surface in abutting engagement with each other,

(4) first means for adjusting the force of said first spring means,

(5) a punch holder mounted on said ram for holding said punch and vertically movable in unison with said punch and relative to said ram by a limited distance,

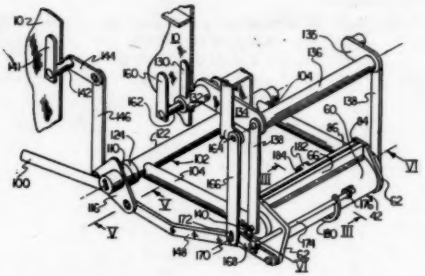
(6) second spring means disposed in said ram for urging said punch holder to a lower end of said limited distance, and

(7) second means for adjusting the force of said second spring means.

## 4,712,719
## VAPOR PHASE PROCESSING MACHINE

Gerard G. Derrico, Maynard, Mass., assignor to Dynapert-HTC Corporation, Concord, Mass.

Filed Jul. 30, 1986, Ser. No. 891,928
Int. Cl.[4] B23K *1/08*
U.S. Cl. 228—37 6 Claims



1. A soldering system for applying molten solder to a work product comprising

solder applicator means including

cylindrical barrel means having an elongated orifice wall extending parallel to the axis of said barrel means, and

nozzle means secured to said barrel means and including a nozzle having an elongated orifice surface,

means for supporting said nozzle for movement from a first position whereat said orifice surface and said orifice wall define an elongated orifice having a selected opening to a second position whereat the opening is substantially enlarged, and

compressed spring means located between said nozzle and said cylindrical barrel means for forcefully biasing said nozzle towards said first position said spring means being further compressed when said nozzle is at said second position,

means for displacing said nozzle from said first position to said second position,

means for supplying molten solder to said solder applicator means, and

means for conveying work product past said solder applicator.

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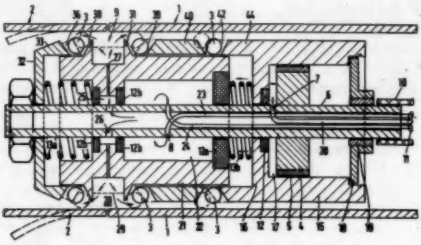
## 4,712,720
## DEVICE FOR MUTUALLY CENTERING AND CLAMPING TWO PIPE BODIES TO BE WELDED TO ONE ANOTHER

Klaus Tesch, Dorotheenstrasse 93, 2000 Hamburg 60, Fed. Rep. of Germany

PCT No. PCT/EP86/00131, § 371 Date Nov. 14, 1986, § 102(e) Date Nov. 14, 1986, PCT Pub. No. WO86/05430, PCT Pub. Date Sep. 25, 1986
PCT Filed Mar. 11, 1986, Ser. No. 937,064
Claims priority, application Fed. Rep. of Germany, Mar. 14, 1985, 8507555; Sep. 11, 1985, 8525952
Int. Cl.[4] B23K *31/06*
U.S. Cl. 228—49.3 16 Claims

1. A device for mutually centering and clamping two workpieces (1,2; 50,51) which are to be welded to one another and contain a round bore, which device, for each of the workpieces, has a clamping unit on both sides of a welding area (9) provided with an inert gas supply, which clamping unit comprises at least one peripheral row of clamping members (3) which are contained in a clamping groove (36, 39, 42), can be stretched outwards or relaxed inwards by mutual axial approach or distancing of the flanks (52, 53) of the clamping groove and have an outwardly pointing clamping surface (54)

for the contact with the bore surface of the workpiece and are also at a distance (57) from one another in the peripheral direction, wherein the axial extent (58) of the clamping members



(56), lined up in large number at a slight distance (57) from one another, is greater than the width of their clamping surfaces (54) in the peripheral direction.

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4,712,721

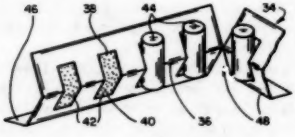
## SOLDER DELIVERY SYSTEMS

Raymond Noel, Menlo Park; William M. Robinson, Palo Alto; Gabe Cherian, Fremont; Thomas H. Clifford, Half Moon Bay; William D. Carlomagno; William M. Deasy, both of Redwood City, all of Calif.; Willie K. Grassauer, Mapleton, Oreg.; David K. Haygood, Sunnyvale, Calif.; H. Paul Sherlock, San Francisco, Calif., and Harry E. White, Newark, Calif., assignors to Raychem Corp., Menlo Park, Calif.

Filed Mar. 17, 1986, Ser. No. 840,624

Int. Cl.[4] H01L *21/58;* B23K *1/12*

U.S. Cl. 228—56.3 24 Claims



1. A solder post delivery system comprising:

a positioning means for positioning solder posts, said positioning means being elongated along a longitudinal axis, said positioning means having a plurality of longitudinally spaced openings therethrough, each of said openings having a top and a bottom generally parallel to said longitudinal axis wherein said positioning means is folded along a line generally parallel to the tops and bottoms of said openings providing unobstructed access to said solder posts;

an elongated and flexible backing means having at least one adhesive surface, said backing means connected to said positioning means by said surface and to solder posts to be positioned through said openings; and

a plurality of solder posts positioned by said openings and held therein by said backing means, said positioning means capable of being bent with respect to said longitudinal axis to align the ends of said solder posts with respect to electrical components to be interconnected.

4,712,722

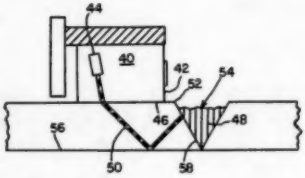
## CONCURRENT ULTRASONIC WELD EVALUATION SYSTEM

Donald W. Hood; John A. Johnson, and Herschel B. Smartt, all of Idaho Falls, Id., assignors to EG&G, Inc., Wellesley, Mass.

Filed Sep. 4, 1985, Ser. No. 772,527

Int. Cl.[4] B23K *5/22, 9/32, 37/00*

U.S. Cl. 228—104 19 Claims



1. Apparatus for concurrent non-destructive evaluation of partially completed welds for use in conjunction with an automated welder, comprising:

(a) generating means, mounted to maintain in predetermined fixed proximate spatial relationship to the automated welder, for generating ultrasonic signals and for coupling the ultrasonic signals in real-time to the region of the partially completed weld;

(b) detection means for detecting ultrasonic signals reflected within a reflection period of predetermined resolution from the region of the partially completed weld; and,

(c) analysis means for processing in real-time the ultrasonic signals within the reflection period detected by the detection means to identify welding flaws in response thereto.

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4,712,723

## METHOD FOR BONDING AN INSULATED WIRE ELEMENT ON A CONTACT

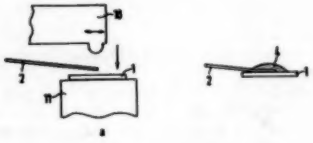
Helmut Moll, Erlangen; Gerd Wiegel, Langenzenn; Josef Schindler, Regensburg; Wilfried Scherer, Rieden, and Kurt Marth, Regensburg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Apr. 14, 1986, Ser. No. 851,839

Claims priority, application Fed. Rep. of Germany, Apr. 15, 1985, 3513436

Int. Cl.[4] B23K *21/00*

U.S. Cl. 228—111 12 Claims



1. A method for bonding a metallic wire coated with an insulated lacquer layer to a metallic contact element, which comprises the steps of:

(a) applying ultrasonic energy to the wire so that the lacquer layer is broken up and the wire is deformed in a certain area and welded to the contact element; and

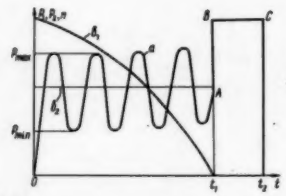
(b) enclosing the entire area of deformation with an thixotropic adhesive.

4,712,724

## METHOD OF FRICTION WELDING

Vladimir K. Lebedev, ulitsa Engelsa, 25, kv. 12; Ivan A. Chernenko, ulitsa Lomonosova, 24, kv. 125; Alexandr T. Dyshlenko, ulitsa Vasilkovskaya, 49, korpus 3, kv. 14; Leonid V. Litvin, ulitsa Vernadskogo, 87, kv. 46, and Vladimir I. Tishura, ulitsa Chigorina, 55, kv. 27, all of, Kiev, U.S.S.R.

Filed Nov. 12, 1986, Ser. No. 930,663
Int. Cl.[4] B23K *27/00*
U.S. Cl. 228—112 2 Claims




1. A method of friction welding comprising the steps of:

jigging coaxially the parts to be welded end face-to-end face having diameters which are the same or different and the materials of which have inherent Young's moduli;

setting said parts to be welded to rotate with respect to each other;

applying to said parts to be welded, while heating up said parts so as to accomplish friction welding, an axial pressure recurrently varying with a frequency which is in inverse proportion to the smaller value of said Young's moduli of said materials of said parts welded and to said diameter or the smaller of said different diameters, whereby the value of said frequency varies over a range between + and −15%; and upset-forging said parts welded together.

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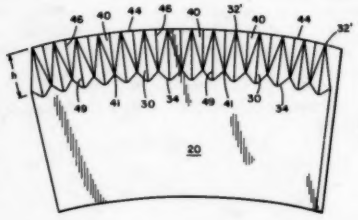
4,712,725

## CONTAINER WITH INTEGRAL FOLD-IN CLOSURE LID

Timothy J. Moore, 301 Diamond, Redondo Beach, Calif. 90277

Filed Sep. 17, 1986, Ser. No. 908,245
Int. Cl.[4] B65D *1/00*
U.S. Cl. 229—8 3 Claims




1. A container for holding and dispensing liquids and solids, comprising:

a main container portion defining a hollow cavity in which material to be dispensed is stored, said main container portion having a bottom portion and an upper rim portion defining the mouth of a container;

an inwardly-foldable closure-lid portion, said closure-lid portion having a peripheral base portion connected to said upper rim portion, said base portion being pivotal relative to said rim portion so that said closure-lid portion may be folded inwardly to close off the mouth of said container portion;

said closure-lid portion comprising a first series of substantially triangular-shaped sections, each said section of said first series comprising a pair of sides and a base, the bases of said sections of said first series defining said peripheral base portion of said closure-lid portion connected to said upper rim portion, each said section of said first series defining a first apex thereof facing away from said upper rim portion;

a second series of substantially triangular-shaped sections, each said section of said second series comprising a pair of sides and a base, the bases of said sections of said second series defining an outer edge portion of said closure-lid portion when said closure-lid portion is in its open-position to allow dispensing and filling of the container, each said section of said second series defining a second apex;

said sections of said first series alternating with said sections of said second series about said closure-lid portion such that a section from said first series is positioned between a pair of sections of said second series, and a section from said second series is positioned between a pair of sections of said first series;

each said section of said second series having a first fold line to allow for the folding thereof when said closure-lid portion is folded inwardly to close off the mouth of the container;

each said section of said first series having a height thereof slightly greater than the radius of said mouth of said container portion, so that said apex of each section of said first series, when said first series is positioned in the mouth of said container portion, lies in a plane spaced from a plane containing therein said upper rim portion of said container portion, said plane of said apex lying closer to said bottom portion of said container portion than said upper rim portion;

each said section of said first series having a second fold line extending substantially along the height thereof parallel to said first fold line when said sections are in their open state; each said first fold line of said sections of said second series bisecting the respective triangle thereof along the entire height thereof from the respective said second apex to the respective said base thereof, said pair of sides of each said section of said second series defining third and fourth fold lines with directly adjacent sections of said first series, each said third and fourth fold lines extending from the respective said apex of the respective said section of said second series to the respective said base of the respective said section of said second series, whereby added strength and holding force is provided to said closure-lid portion;

each said base of each said section of said first series having a fifth fold line thereof, each said fifth fold line being arcuate in shape to aid in the folding-in of said sections of said first series to close off said mouth of said container portion.

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4,712,726

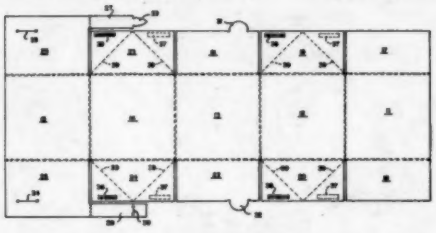
## SIMULATED GIFT WRAP BOX

Kenneth Fonas, 814 Pittsburgh St., North Versailles, Pa. 15137

Continuation-in-part of Ser. No. 732,729, May 10, 1985, abandoned. This application Sep. 24, 1986, Ser. No. 911,253
Int. Cl.[4] B65D *1/00*
U.S. Cl. 229—8 17 Claims

1. A simulated gift wrap box having an open top body and cover of paperboard and the like, the body having a unitary bottom and two unitary oppositely disposed side panels only with extensions at each end of said bottom and said side panels respectively hinged thereto and folded against each other, the cover having a unitary top and at least one unitary side panel with extensions at each end of said top and said side panel respectively hinged thereto and folded against each other, the top panel and bottom panel extensions having their outer cor-

ners folded inwardly against them respectively on diagonal lines to form isosceles figures, the extensions of said at least one



cover side panel overlapping said body side panel extensions and underlapping said body isosceles figures.

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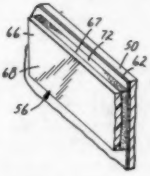
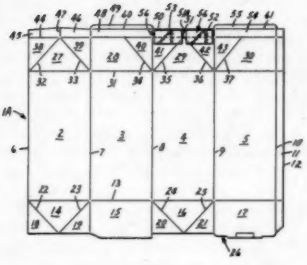
**4,712,727**

## GABLE-TOP CONTAINER CLOSURE SYSTEM

**Gregory R. Wyberg, Minneapolis, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Apr. 10, 1987, Ser. No. 36,969**
**Int. Cl.[4] B65D 5/06**
**U.S. Cl. 206—631.3** **22 Claims**





1. A sheet material blank for constructing a sealed gable-top container with a thermoplastic inner surface coating responsive to a container sealing process, said blank comprising:

(a) four body panels including front and back panels and first and second side panels;

(b) bottom closure panel means for closing a bottom of a said container;

(c) first and second oppositely disposed roof panels connected to upper edges of said first and second side panels, respectively;

(d) first and second opposed substantially triangular end panels connected to upper edges of said front and back body panels,

(e) first and second foldback panels, said first foldback panel connected to said first roof panel and to one lateral edge of said first triangular end panel, and said second foldback panel connected to said second roof panel and to the other lateral edge of said first triangular end panel;

(f) third and fourth foldback panels, said third foldback panel connected to said first roof panel and to one lateral edge of said second triangular end panel, and said fourth foldback panel connected to the other lateral edge of said second triangular end panel and adapted to be connected to said second roof panel;

(g) first and second gable rib panels connected to upper edges of said first and second foldback panels and having upper edges and lateral edges, and connected to each other at a common line;

(h) third and fourth gable rib panels connected to upper edges of said third and fourth foldback panels, respectively, and to each other;

(i) first and second roof rib panels connected to upper edges of said first and second roof panels, respectively, each said roof rib panel connected at one side thereof to one of said first and second gable rib panels;

(j) first and second upper rib panels connected to upper edges of said first and second roof rib panels, respectively;

(k) first roof wing panel comprising a triangular portion of said first roof panel adjoining said first foldback panel and said first roof rib panel and connected thereto;

(l) second roof wing panel comprising a triangular portion of said second roof panel adjoining said second foldback panel and said second roof rib panel and connected thereto; and

(m) at least one stiffening fillet overlying a portion of, and bonded to the inner surface of at least one of said (x) first gable rib panel, (xx) second gable rib panel, (xxx) first roof rib panel, and (xxxx) second roof rib panel, for simultaneously stiffening said overlain panel to transfer applied opening forces therealong and for limiting the force required to open said container from the sealed condition, said fillet comprising a strip of material resistant to the temperature and pressure of said container sealing process and a layer of adhesive attached to one side of said strip and to said inner surface of said at least one said panel for bonding said strip thereto.

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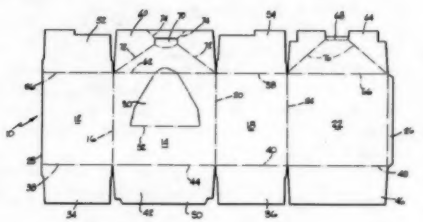
**4,712,728**

## CARTON WITH IMPROVED HANDLE

**Richard L. Schuster, Monroe, La., assignor to Manville Corporation, Denver, Colo.**

**Filed Apr. 2, 1987, Ser. No. 33,280**
**Int. Cl.[4] B65D 5/46**
**U.S. Cl. 229—52 B** **20 Claims**



1. In a paperboard carton, an upper panel structure comprising:

an inner top panel;

an outer top panel overlapping a portion of the inner top panel;

the inner top panel containing a flap having an outer surface and an interior surface, and also having a free edge and an opposite edge foldably connected to the inner top panel in the overlapped portion thereof to form a foldable connection;

the outer top panel containing a flap covering a handle

opening, the outer top panel flap having a free edge and an opposite edge foldably connected to the outer top panel to form a foldable connection, the foldable connections of the inner and outer top panel flaps being farther apart than the free edges of the flaps;

the free edge of the outer top panel flap overlying the outer surface of the inner top panel flap so that when fingers of a user press down on the outer top panel flap, the free edge of the outer top panel flap pivots downwardly about the foldable connection of the outer top panel flap and the inner top panel flap pivots downwardly about the foldable connection of the inner top panel flap, the inner top panel flap adapted to be folded under by the fingers and the outer top panel flap adapted to be pivoted downwardly by the backs of the fingers; and

means causing the outer top panel flap to pivot upwardly upon removal of the fingers of a user.

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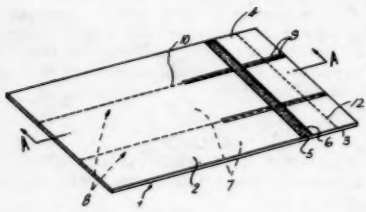
**4,712,729**

## TAMPER EVIDENT ENVELOPE

**John P. Craig, Redmond, Wash., assignor to Trigon Packaging Systems Limited, Hamilton, New Zealand**

**Filed Jul. 1, 1986, Ser. No. 880,882**
**Int. Cl.[4] B65D *27/08, 27/16***
**U.S. Cl. 229—72** **10 Claims**



1. An envelope comprising:

a body formed from a front and a rear panel having an opening at at least one edge of said panels;

a closure flap formed as an extension of said rear panel and extending beyond said opening;

a crosswise pressure adhesive closure strip applied across the full width of the body adjacent said opening so that when said flap is folded to overlap said front panel and close said opening said closure strip retains said flap in the closed position;

separator means extending lengthwise between said panels to form at least two separate compartments in the envelope;

lengthwise extending pressure sensitive adhesive tracks on said closure flap and on at least the portion of said front panel which said closure flap overlaps on at least one of said separator means; and

tear lines extending between said adhesive tracks for a distance at least of the depth of the flap;

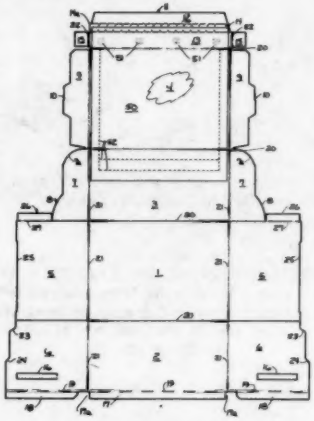
the arrangement and construction being such that on closing of said flap and application of pressure to said adhesive strip and tracks the envelope is divisible into separable sections each having a compartment therein and access to said compartments can be gained without disturbing the adjacent closed section.

**4,712,730**

## ICE-CREAM CARTON, CARTON BLANK, AND METHOD OF ERECTING SAME

**Thomas W. Froom, 10 Burncoat Way, Pittsford, N.Y. 14534**

**Filed May 23, 1986, Ser. No. 866,890**
**Int. Cl.[4] B65O *5/28***
**U.S. Cl. 229—169** **26 Claims**



1. In an integral carton blank, adapted to be erected into a carton, said carton blank having a bottom panel, a front panel hingedly connected to said bottom panel, a rear panel hingedly connected to said bottom panel, a cover panel hingedly connected to said rear panel, and a cover panel front flap comprising tear-away means connected to said cover panel and adapted to overlap said front panel and to be releasably secured thereto in the erected carton, said bottom panel having end flaps hingedly conected thereto, said rear panel having end flaps hingedly connected thereto, said front panel having end flaps hingedly connected thereto, said cover panel having end flaps hingedly connected thereto, and said cover panel front flap having end posts hingedly connected thereto, said bottom panel, front panel, and rear panel end flaps being adapted to be folded in to form end walls in the erected carton, and said cover panel front flap end posts being adapted to overlie said cover panel end flaps and to be secured thereto in the erected carton to form a skirted cover, the improvement which comprises:

said bottom panel end flaps are adapted to be infolded so as to constitute the inner end walls of the erected carton, said front panel end flaps are adapted to overlie said said bottom panel end flaps in the erected carton, and said rear panel end flaps are adapted to overlie said bottom panel end flaps and to overlap said front panel end flaps in the erected carton,

said bottom panel end flaps are full end flaps having an area adapted essentially to close an open end of a carton erected from said blank,

said bottom panel end flaps have a recess along a major portion of an outer marginal edge thereof adapted to underlie the cover panel in the erected carton and of a depth corresponding generally to the thickness of the material of construction of said carton blank,

said front panel end flaps are adapted to overlie a major area of the bottom panel end flaps in the erected carton and have, along an edge thereof adapted to be an upper edge thereof in the erected carton, a lip extending along a major portion of the reach thereof and adapted to coincide with said recess in said outer marginal edge of said bottom panel full end flaps in a closed carton erected from said blank, and

said rear panel end flaps being adapted to overlie a minor

area of said bottom panel full end flaps and to overlap said front panel end flaps and to be secured thereto by single lines of adhesive extending from the bottom of the rearwardmost edges of said front panel end flaps along the edges thereof and ending below the cover panel end flap lower edges as they will be located in the erected carton.

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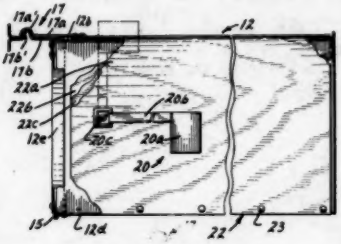
**4,712,731**

## MAIL BOX STRUCTURE

George W. Gramelspacher, 3955 Frankfurt St., Jasper, Ind. 47546

Filed Jul. 22, 1986, Ser. No. 888,120
Int. Cl.[4] B65D 91/00
U.S. Cl. 232—17 5 Claims




1. A mail box structure comprising a housing defined by an arcuate upper portion blending into side walls, a bottom wall, a back wall, an entry door, a latching mechanism cooperable between said housing and said entry door, a unitary sheet of thin flexible plywood presenting dimensionally stable and strong physical properties overlying said housing in a conforming and engaging relationship, and means securing said unitary sheet of thin flexible plywood to said housing.

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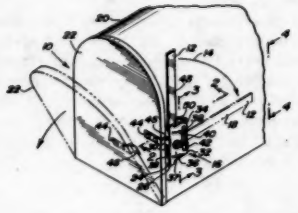
**4,712,732**

## REVERSIBLE MAILBOX SIGNALING DEVICE

Aldo Esopi, 929 Belfurd Rd., Allentown, Pa. 18103

Filed Jan. 23, 1987, Ser. No. 6,220
Int. Cl.[4] A47G 29/12
U.S. Cl. 232—35 6 Claims



1. A transposable, dual mode mailbox signaling device for mounting on either side of a rural mailbox, said device comprising:

(a) a housing generally symmetrical along its horizontal axis, attachable to either side of a mailbox proximate the mailbox door, said housing including a front face, a proximal end serving as a first stop and including a centered elongated aperture to receive a flagstaff flange, and an open distal end, an open top edge and an open bottom edge;

(b) a longitudinally symmetrical, generally planar flagstaff, said flagstaff having a first and second end and two sides and two parallel edges, said flagstaff mounted at its first end within said housing for pivotal movement about its horizontal axis, said flagstaff first end also including an opposing pair of flanges, said opposing flanges being planar extensions of said flagstaff edges and perpendicular to the longitudinal axis of said flagstaff, and a third flange projecting in the same longitudinal axis as said flagstaff at said flagstaff's first end, each said flange sized to fit through said housing's proximal edge's aperture;

(c) a generally longitudinally symmetrical flag attached to said flagstaff's other end; and

(d) reversible means attachable to a mailbox door, said means including a detent to retain, depending on which side of said mailbox said housing is mounted, one of said corresponding opposing flanges of said flagstaff when said flag extends from said open top edge,

whereby, when said means to retain one of said opposing flanges in place is removed by opening said mailbox door, said flag falls approximately 180 degrees by gravity, through said housing's top edge, distal end and bottom edge, until engaging said housing's proximal end as a said first stop.

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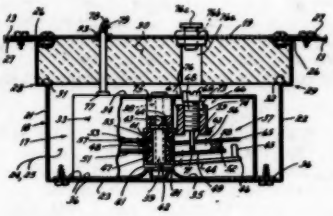
**4,712,733**

## INTERNALLY MOUNTED DUTY CYCLING CONTROL

Raymond K. Davis, 40 Edgewood Dr., Lawrenceburg, Ind. 47025

Filed Mar. 24, 1986, Ser. No. 842,829
Int. Cl.[4] F23N 5/20
U.S. Cl. 236—10 13 Claims



1. A heating system comprising means to heat air, a duct adapted to transfer air from said means to heat air in an air flow direction;

a duty cycling control adapted to deactivate said means to heat air,

said duty cycling control comprising:

an adjustable temperature sensitive switch including a temperature sensitive element operable to open and close said switch;

a case completely enclosing said temperature sensitive switch said case including a metal base;

heat conductive means to transfer heat from said metal base to said temperature sensitive element;

means mounting said entire duty cycling control within said duct;

means to adjust said duty cycling switch when mounted within said duct;

wherein said means mounting said duty cycling control within said duct comprises a bracket fixed to said duct; wherein said bracket includes a metal base panel wherein said metal base of said case is fixed to said panel; and

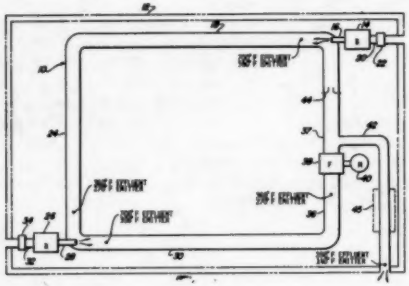
wherein said duct defines an opening adapted to receive said bracket and said bracket includes a top wall adapted to completely cover said opening and at least one said wall extending from said top wall to said metal base panel.

4,712,734

## LOW-INTENSITY INFRARED HEATING SYSTEM WITH EFFLUENT RECIRCULATION

Arthur C. W. Johnson, 2611 Lake Charnwood, Troy, Mich. 48084

Filed May 8, 1986, Ser. No. 860,859
Int. Cl.[4] F24H *3/00*; F24C *3/00*
U.S. Cl. 237—70 18 Claims



1. A low-intensity infrared heating system comprising:
emitter means defining a continuous loop to circulate effluent introduced therein;
a burner having a combustion chamber with a combustion air input, both said chamber and said input being external to the loop of said emitter means for producing a hot gaseous effluent;
means connecting said burner to said emitter means to introduce said effluent into said emitter means;
an exhaust means connected to said emitter means to exhaust a portion of the circulating effluent;
the mass flow capacity of said emitter tube being substantially greater than the flow capacity of said exhaust means whereby at least a substantial portion of the effluent passes said exhaust means and recirculates through said loop.

4,712,735

## PRESTRESSED CONCRETE CROSS TIE HAVING INCREASED FATIGUE LIFE

Steven L. Jantzen, 404 E. Pearle Apt. #6, Jerseyville, Ill. 62052, assignor to Steve L. Jantzen, Jerseyville, Ill.

Continuation of Ser. No. 521,274, Aug. 8, 1983, abandoned. This application Feb. 6, 1986, Ser. No. 767,857
Int. Cl.[4] E04C *3/10*
U.S. Cl. 238—94 5 Claims

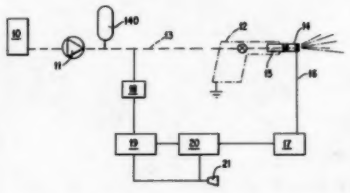
1. A prestressed concrete tie assembly comprising:
a concrete tie body wherein the cross section of the body varies transversely across the tie and includes a pair of track support portions of large cross sections, end portions of reduced cross sections, and a center portion of reduced cross section;
a plurality of prestressed metallic rods spaced across the transverse extent of the concrete body and extending throughout the longitudinal extent of the body;
said concrete body having a neutral axis which varies according to the cross section of the body portion;
said rods being located at a single level within the concrete body, and at the same time being located sufficiently near the varying neutral axis of the concrete body whereby stress fluctuations in the rods do not exceed the endurance limit of the rod material, and wherein in the track support portions of the body, the strands are located below the neutral axis of the section, and wherein at the center and end portions of the body the strands are located above the neutral axis of the section.

4,712,736

## METHOD AND SYSTEM FOR MAINTAINING A SPRAY PATTERN

David J. Bray, Bromsgrove, and Francis R. Piper, Evesham, both of United Kingdom, assignors to Gaydon Technology Limited, Uxbridge, United Kingdom

Continuation of Ser. No. 820,897, Jan. 17, 1986, abandoned, which is a continuation of Ser. No. 684,853, Dec. 21, 1984, abandoned, which is a continuation of Ser. No. 360,643, Mar. 22, 1982, abandoned. This application Jul. 18, 1986, Ser. No. 885,819
Claims priority, application United Kingdom, Mar. 27, 1981, 8109652
Int. Cl.[4] B05B *17/04*
U.S. Cl. 239—11 14 Claims



1. A method of maintaining an optimum spray pattern during spraying of a pressurized medium from a spray unit, the spray unit having an adjustable nozzle formed of electrically conducting material but which is electrically isolated from the remainder of the spray unit, so that during spraying a voltage is generated on the nozzle by the atomization of the pressurized medium flowing therethrough, the method comprising the steps of:
(1) monitoring the voltage generated on the nozzle as a medium is sprayed from the nozzle in a spary pattern;
(2) comparing the monitored voltage with at least one reference voltage indicative of the optimum spray pattern;
(3) sensing any deviation of the monitored voltage beyond predetermined limits;
(4) taking corrective action, in response to any sensed deviation of the monitored voltage beyond predetermined limits, such corrective action selected from the steps of (1) adjusting the nozzle size (2) adjusting the pressure of the pressurized medium, (3) clearing the nozzle, so as to restore the monitored voltage back within the predetermined limits, thereby insuring that an optimized spray pattern is maintained.

4,712,737

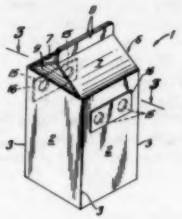
## AIR FRESHENER CONTAINER HAVING RESEALABLE OPENINGS

Robert J. Hecking, Passaic, N.J., assignor to Champion International Corporation, Stamford, Conn.

Filed Aug. 9, 1985, Ser. No. 764,017
Int. Cl.[4] A61L *9/04*
U.S. Cl. 239—58 7 Claims

1. An air freshener package comprising a unitary folded container formed of a single ply of foil laminated lined paperboard having two opposed pairs of upstanding side walls, a bottom wall and a gable top comprising a pair of inclined top walls and a pair of top flaps articulated to the respective top walls and adhered in face-to-face relationship to securely seal the container top; and an air freshener contained therein, a plurality of openings formed in said single ply of foil laminated lined paperboard in said gable top of said container, said open-

ings being covered by a release tape which can be removed permitting exposure of less than all of the openings depending



on the amount of air freshener desired to be exposed to the atmosphere.

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**4,712,738**

## SPRAYING EQUIPMENT

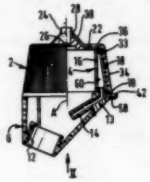
**David C. Gill, Bristol, United Kingdom, assignor to Nomix Manufacturing Co. Limited, Bristol, Great Britain**

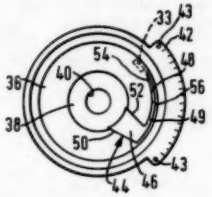
**Filed Mar. 6, 1986, Ser. No. 836,835**

**Claims priority, application European Pat. Off., Mar. 18, 1985, 85301865.3; United Kingdom, Sep. 25, 1985, 8523647**

**Int. Cl.[4] B05B** *3/02*

**U.S. Cl. 239—74** **10 Claims**





1. A spraying head body for supporting a rotary distribution element, the body comprising:

a first fixed body component having a central aperture in one face thereof and for receiving a drive shaft to extend through said aperture for driving a distribution element, a second aperture in said face radially distant from said central aperture, a supply duct adapted to supply fluid to said second aperture, a conical projection having an aperture and a tubular element extending from said projection, said second apertures on said projection and tubular element being coaxially aligned with said central aperture, a plurality of splines extending radially from said tubular element and spaced therearound; and

a second rotatable body component having an inner face formed to mate with said one face on said fixed body component, said rotatable component having a conical recess in said face sized to receive said conical projection and having a central aperture to be coaxially aligned with said central aperture of said first component and sized to receive said splines, passage means in said inner face for directing and contolllng the flow of fluid from said second aperture to said conical recess by rotation of said second component so that fluid may flow to a rotary distribution element.

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**4,712,739**

## SPRAY GUN NOZZLE ASSEMBLY RETAINER CLIP AND SPRAY GUN NOZZLE ASSEMBLY

**Raymond J. Bihn, Oregon, Ohio, assignor to Champion Spark Plug Company, Toledo, Ohio**

**Filed Oct. 3, 1986, Ser. No. 915,307**

**Int. Cl.[4] B05B** *15/06*

**U.S. Cl. 239—290** **10 Claims**

1. A spray gun assembly including a spray gun barrel defining at least one fluid passage and having an end, a cap positioned over said barrel end, said cap having an interior surface spaced from an exterior surface on said barrel end to form a chamber, removable means engaging said barrel for retaining said cap on said barrel end, and a clip frictionally holding said cap on said barrel end, said clip comprising a tubular body, means for attaching said clip body to said barrel end, said spray gun having at least one fluid passage extending through said barrel, said clip and said cap, and holding means projecting from said body for frictionally engaging said interior cap surface while permitting easy removal of said cap from said barrel when said retaining means is removed from said barrel.

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**4,712,740**

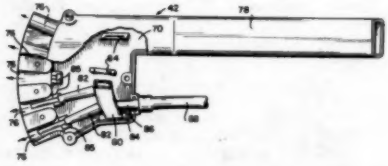
## VENTURI SPRAY NOZZLE FOR A CLEANING DEVICE

**L. Scot Duncan, Independence; Hugh F. Groth, Richfield, and John M. Collins, Sagamore Hills, all of Ohio, assignors to The Regina Co., Inc., Rahway, N.J.**

**Continuation of Ser. No. 585,872, Mar. 2, 1984, abandoned. This application Mar. 17, 1986, Ser. No. 841,054**

**Int. Cl.[4] B05B** *7/30*

**U.S. Cl. 239—340** **10 Claims**



1. A cleaning device comprising: a source of cleaning fluid; a source of pressurized air; spray means connected to said fluid and air sources for educing fluid from said fluid source using said pressurized air and forcibly spraying said fluid onto a surface to be cleaned; said spray means including an air manifold provided by and internally of a housing which is open at one end and which is connected to said air source to pressurize said housing, said housing having separate, interconnected top and bottom walls and having a plurality of nozzle channels extending from said air manifold and formed by constrictions in at least one of said walls of said housing, said constrictions extending inwardly into said manifold from said open one end of said housing; and a fluid manifold connected to said fluid

source and having a plurality of fingers extending therefrom, each finger being positioned in a respective nozzle channel so that pressurized air flowing through said channels educes fluid from said fingers.

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**4,712,741**

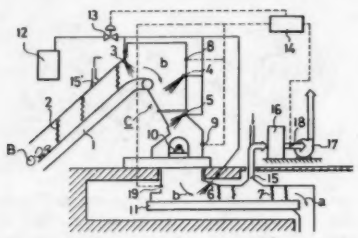
## EXPLOSION PREVENTIVE ROTATION CRUSHER

**Kunihiko Uno, Hirakata; Yoshinori Tamade, Kobe; Seiya Horino, Miki, and Tamotsu Kodera, Otsu, all of Japan, assignors to Kabushiki Kaisha Takuma, Japan**

**Continuation of Ser. No. 589,447, Mar. 14, 1984, abandoned. This application Aug. 28, 1985, Ser. No. 770,363**

**Int. Cl.[4] B02C *25/00***

**U.S. Cl. 241—16** **6 Claims**



1. In a crushing process at a temperature, absent the injection of steam, below 100° C., for crushing materials including combustible substances in which steam is injected to limit the amount of oxygen in said crushing process to thereby eliminate the possibility of explosions, the additional improvement steps comprising:

(a) determining the amount of steam necessary to prevent an explosion in accordance with the graphs illustrated in FIGS. 1 through 3;

(b) deriving from the determination made in step (a) a corresponding minimum amount of oxygen below which none of the combustible substances could tend, together with any oxygen in said crushing process, to cause an explosion;

(c) measuring the temperature of said crushing process at a plurality of locations to establish by the measured temperature the amount of steam present in said crushing process and thereby also establishing the amount of oxygen present in said crushing process; and

(d) injecting, in response to the temperature as measured, no more steam than is required to keep the temperature of the crushing process at a level that assures that the oxygen content, illustrated as a function of temperature in FIG. 4, does not exceed the value necessary to sustain an explosion.

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**4,712,742**

## PREPARATION OF DEASHED HIGH SOLID CONCENTRATION COAL-WATER SLURRY

**Takayuki Ogawa, Yokohama; Hideaki Ito, Chigasaki; Naokazu Kimura, Tokyo; Hayami Ito, Himeji; Shuhei Tatsumi; Shoichi Takao, both of Akashi; Nitaro Suzuki; Takashi Watanabe, both of Funabashi; Kunizo Shinano, Matsudo; Takashi Kuwabara, Kawasaki, and Kaoru Aoki, Hiratsuka, all of Japan, assignors to Electric Power Development Co., Ltd., Tokyo; Kawasaki Jukogyo Kabushiki Kaisha, Kobe-shi and Sumitomo Heavy Industries, Ltd., Tokyo, all of, Japan**

**Filed Nov. 15, 1985, Ser. No. 798,524**

**Claims priority, application Japan, Nov. 20, 1984, 59-246485**

**Int. Cl.[4] B02C *19/12***

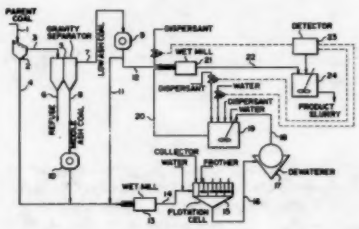
**U.S. Cl. 241—20** **6 Claims**

1. A process for preparing a deashed high solid concentration coal-water slurry comprising the steps of:

(a) subjecting a parent coal to screening to classify it into a coarse-grained coal and a fine-grained coal;

(b) subjecting said coarse-grained coal to gravity classification to classify it into a low ash coal, a middle ash coal and a high ash coal, said middle ash coal having a specific gravity higher than that of said low ash coal and lower than that of said high ash coal;

(c) mixing said fine-grained coal with said coarse middle ash coal and further mixing a first fraction of the coarse low ash coal therein, and wet grinding this mixture to prepare a slurry suitable for flotation, said first fraction being about 15% by weight, based on the weight of said parent coal;



(d) subjecting said slurry to flotation to thereby obtain a froth having a reduced ash content;

(e) dewatering said froth and thereafter adding water thereto to thereby prepare another slurry containing 40–60 wt. % of coal solids;

(f) mixing the balance of the coarse low ash coal obtained in the step (b) with said another slurry according to the solid concentration of said another slurry so that the solid concentration of the final product coal-water slurry may take a target value; and

(g) wet grinding the mixture from the step (f) to obtain the final product coal-water slurry.

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**4,712,743**

## CRUSHER GAP SETTING

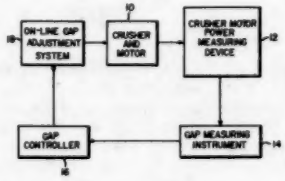
**Lee Nordin, 2403 Highpoint, Kotze Street, Hillbrow, Johannesburg, Transvaal, South Africa**

**Filed May 20, 1985, Ser. No. 735,951**

**Claims priority, application South Africa, May 22, 1984, 84/3853**

**Int. Cl.[4] B07C *19/00***

**U.S. Cl. 241—30** **6 Claims**




1. A method of maintaining a predetermined size of crushing gap in an ore crusher of the type comprising crusher means defining an adjustable crushing gap, and a driving motor for driving said crusher means, said method comprising the steps of:

establishing a predetermined gap size,

measuring noise in the power drawn by said motor during a crushing operation, which measured noise is indicative of the size of said crushing gap,

setting said crushing gap at said predetermined gap size in accordance with said measured noise, and

maintaining the crushing gap at said predetermined gap size.

4,712,744

## APPARATUS FOR CHARGING AT LEAST ONE TOP-LOADING CRUSHER

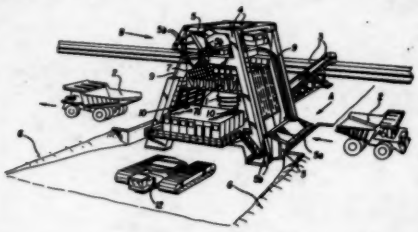
**Bernd Kirchhoff, and Hermann Mecklenfeld, both of Ennigerloh, Fed. Rep. of Germany, assignors to O&K Orenstein & Koppel Aktiengesellschaft, Dortmund, Fed. Rep. of Germany**

**Filed May 28, 1986, Ser. No. 867,647**

**Claims priority, application Fed. Rep. of Germany, Jun. 4, 1985, 3520062**

**Int. Cl.[4] B02C *21/02***

**U.S. Cl. 241—80** **8 Claims**



1. A crusher system comprising:

a top-loading crusher for converting bulk charge material to comminuted material;

a transportable supporting framework, said crusher being carried by said framework at a lower portion thereof;

a plurality of buckets arranged along sides of said framework;

means for elevating said buckets from a loading position near a bottom of said framework to a discharge position at a top of said framework, said elevating means orienting said buckets at said loading position to direct openings of said buckets for receiving charge material from external transport vehicles, said elevating means reorienting said buckets at said discharge position to direct said bucket openings for discharging said charge material; and

a hopper disposed between said crusher and said discharge position for directing charge material from said buckets to said crusher, said hopper receiving charge material intermittently from said buckets and continuously feeding said charge material to said crusher.

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4,712,745

## ROTATING DISC WOOD CHIP REFINER

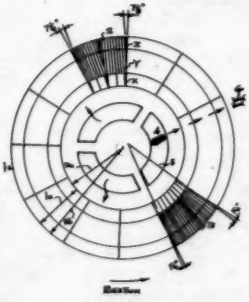
**William C. Leith, Box 157, Trail, British Columbia, Canada V1R 4L4**

**Filed Aug. 19, 1985, Ser. No. 767,121**

**Claims priority, application Canada, Jun. 6, 1985, 483274**

**Int. Cl.[4] B02C *7/08, 7/12***

**U.S. Cl. 241—261.3** **9 Claims**



1. A refiner plate for a rotating disc wood chip refiner apparatus, said apparatus including a frame; two parallel circular-discs having facing surfaces and mounted concentrically on said frame; means for rotating at least one of said discs, having a direction of rotation, for relative counter-movement of said discs to each other; each disc having a rim portion; each said disc having a multiplicity of refiner plates forming adjacent segments of and mounted on said rim portion of said facing surfaces; each refiner plate having an inner radius and an outer radius, a grid of radial bars and slots defined between said bars; each said radial bar having a leading edge in the direction of said relative counter-movement. a substantially horizontal top surface and two substantially vertical side surfaces; each said slot having a substantially horizontal bottom surface between vertical side surfaces of adjacent bars; a multiplicity of dams located and spaced in each said slot but staggered in parallel slots; and said grid of bars and slots with dams providing multiple bar-crossings caused by said relative counter-movement of said discs to each other, characterized in that said dams are spaced in radial (outwards) outwardly decreasing increments, said increments forming a continuous series of resonant cavities; and said radial bars and slots therebetween are radially and uniformly skewed backwards at a radial angle of about 1.5 degrees to disc rotation in the direction of said relative counter-movement, the backwardly skewed bars and slots on the one disc being skewed in a direction opposite to the backwardly skewed bars and slots on the other disc.

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4,712,746

## METHOD AND APPARATUS FOR FORMING CROSS-WOUND PACKAGES

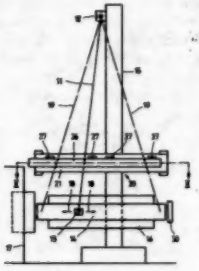
**Felix Graf, Winterthur; Ruedi Schneeberger, Seuzach, and Georg Symon, Winterthur, all of Switzerland, assignors to Rieter Machine Works Limited, Winterthur, Switzerland**

**Filed Aug. 25, 1986, Ser. No. 900,095**

**Claims priority, application Switzerland, Aug. 30, 1985, 03759/85**

**Int. Cl.[4] B65H *54/28***

**U.S. Cl. 242—43 R** **12 Claims**



1. A method for winding a thread arriving from a stationary thread guide to form a cross-wound package, comprising the steps of:

guiding the thread arriving from the stationary thread guide by means of a main traverse mechanism with a movable traverse means through a complete path of traverse movement;

laying the thread onto the cross-wound package;

running the thread to be wound up through a gap formed by elongate guide members in a preliminary traverse mechanism located between the stationary thread guide and said main traverse mechanism;

said elontate guide members extending substantially mutually parallel along substantially said complete path of traverse movement and substantially transverse to the thread;

generating air streams substantially in synchronization with the movement of said movable traverse means of said main

traverse mechanism such that said air streams are time-controlled and flow between said elongate guide members in the longitudinal direction thereof; and

said step of generating said air streams entailing generating said air streams such that said air streams alternatingly flow in opposite directions between said elongate guide members and thus entrain the thread along substantially said complete path of traverse movement of the thread.

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**4,712,747**

**HOMING DEVICE FOR GUIDED MISSILES USING SIDE NOZZLES**

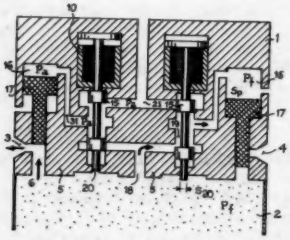
**Pierre Metz, Palaiseau, and Marc Antonicelli, Meung 1 Loire, both of France, assignors to Thomson Brandt Armements, Boulogne Billancourt, France**

**Filed Oct. 8, 1986, Ser. No. 917,102**

**Claims priority, application France, Oct. 8, 1985, 85 14882**

**Int. Cl.⁴ F42B *15/033***

**U.S. Cl. 244—3.22** **11 Claims**



1. Homing device using a propulsion unit with side nozzles for guided missiles, comprising:

a number N of side nozzles;

a gas generator designed to feed the said nozzles;

means to control the blocking and opening of the nozzles so as to affect the trajectory of the missile, comprising, for each nozzle, an electromagnetic device, controlled independently of the electromagnetic devices of the other nozzles so as to block or open the nozzles independently of one another.

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**4,712,748**

**MISSILE**

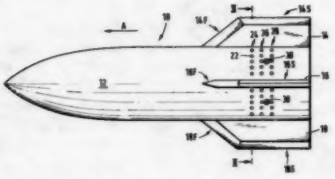
**Berthold Schäfer, Bergisch Gladbach, Fed. Rep. of Germany, assignor to Deutsche Forchungs- und Versuchsanstalt fur Luft- und Raumfahrt e.V., Cologne, Fed. Rep. of Germany**

**Filed Dec. 10, 1986, Ser. No. 940,520**

**Claims priority, application Fed. Rep. of Germany, Dec. 28, 1985, 3546269**

**Int. Cl.⁴ F42B *15/033***

**U.S. Cl. 244—3.22** **18 Claims**



1. Missile, in particular a supersonic missile, which comprises a body provided with, at its rear end, in the direction of flight, a plurality of tail fins, and at least one outflow aperture, for discharging fuel capable of being ignited to change the flight direction of said missile, said outflow aperture being located between adjacent tail fins of the body in an area where, due to shock waves originating from the front edges of the tail fins, recirculations are formed.

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**4,712,749**

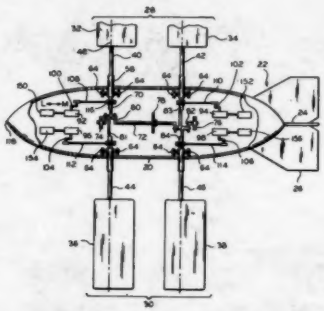
**MEANS FOR AND METHODS OF CONTROLLING ORNITHOPTERS**

**Duke Fox, 5305 Towson Ave., Ft. Smith, Ark. 72901**

**Filed Oct. 11, 1985, Ser. No. 786,624**

**Int. Cl.⁴ B64C *33/02***

**U.S. Cl. 244—22** **18 Claims**



1. An ornithopter aircraft having a fuselage and four rigid tandem mounted wings disposed in forward and rear pairs on opposite sides of the fuselage, whereby said wings have a dragonfly configuration, means for beating said four wings in synchronism with a front wing on one side moving in synchronism with a rear wing on the opposite side, the front and back wings on each one side moving in opposition, the two front wings in opposition, and the two back wings moving in opposition, whereby a first of the forward wings in one tandem pairs on one side of the fuselage beats upwardly simultaneously with a rear wing in the opposing tandem pair on the opposite side of the fuselage, while the remaining two wings are beating downwardly, and means for cyclically varying the pitch of the wings throughout each beat to produce lift on the downstroke and minimum air resistance on the upstroke, the angular pitch of the wings during each of their downstrokes being set to equal the angular pitch corresponding to the angular pitch of a glider wing at the sink rate for the same flying speed.

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**4,712,750**

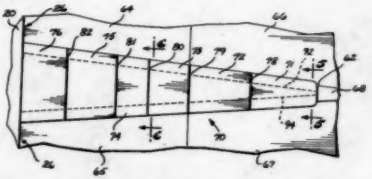
**TEMPERATURE CONTROL DEVICE FOR JET ENGINE NACELLE ASSOCIATED STRUCTURE**

**Robert H. Ridgwell, Kirkland, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed May 2, 1986, Ser. No. 859,015**

**Int. Cl.⁴ B64D *33/04***

**U.S. Cl. 244—117 A** **7 Claims**



1. A temperature control device for use in a jet aircraft engine installation, the engine installation comprising a jet engine having a primary exhaust nozzle from which the jet

engine produces a rearwardly extending primary exhaust plume of hot gases, the primary exhaust plume having a centerline and a generally cylindrical shape about said centerline, the engine installation further comprising a nacelle for supporting and enclosing the jet engine, and a nacelle-associated structure that includes the temperature control device and that extends in a generally fore and aft direction above the centerline of the primary exhaust plume from a forward aerodynamically shaped leading edge to an aft trailing edge, the temperature control device comprising:

a deflector formed at the lowermost surface of the nacelle-associated structure, the deflector having a sheet-like lower surface having a lateral extent greater than the lateral extent of the nacelle-associated structure immediately above the deflector and aligned generally in parallel conformance therewith, the deflector extending longitudinally aft from the primary exhaust nozzle substantially to the trailing edge of the nacelle-associated structure and being positioned such that said lower surface is generally parallel to the primary exhaust plume.

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**4,712,751**

## TAIL END STRUCTURE FOR AN AIRCRAFT FUSELAGE

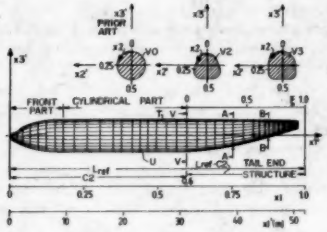
**Ernst H. Hirschel, Zorneding, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung, Munich, Fed. Rep. of Germany**

**Filed Jul. 16, 1986, Ser. No. 886,792**

**Claims priority, application Fed. Rep. of Germany, Jul. 24, 1985, 3526472**

**Int. Cl.[4] B64C *1/00***

**U.S. Cl. 244—119** **18 Claims**




1. A tail end structure for an aircraft fuselage having a longitudinal central axis extending centrally through said fuselage, comprising a circular sectional reference plane as defined by a circular fuselage and extending through an interface between said circular fuselage and said tail end structure perpendicularly to said longitudinal central axis, said circular reference plane having a first centroid, said tail end structure further comprising a tail cross-section with an upper cross-sectional portion within said circular sectional plane above said first centroid and a lower cross-sectional portion below said first centroid, said lower cross-sectional portion having two first lobes extending laterally and downwardly outside said circular sectional reference plane, said lower cross-sectional portion having a second centroid in said tail cross-section located under said first centroid so that a vertical line passes through both centroids, said tail cross-section having upper, lower and lateral contour or silhouette boundary lines appearing within a silhouette formed by said circular sectional reference plane, so that the projection or silhouette of the tail end structure as viewed from the side and from above or below remains the same as that of a tail end structure having a cross-section corresponding to that of said circular sectional reference plane, whereby said cross-sectional portions of said tail end structure blend smoothly into said circular fuselage.

**4,712,752**

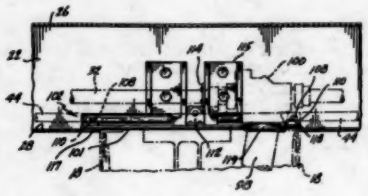
## WING TRAILING EDGE AIR DAM

**Paul F. Victor, Redmond, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Division of Ser. No. 474,654, Dec. 6, 1982, Pat. No. 4,618,109. This application Sep. 19, 1985, Ser. No. 777,827**

**Int. Cl.[4] B64C *3/26***

**U.S. Cl. 244—129.1** **10 Claims**



4. In an aircraft wing having a fixed wing structure, a rear flap extending rearwardly from the fixed wing structure to define a spanwise wing rear cavity, a flap track fairing depending downwardly from the fixed wing structure including from the spanwise rear cavity portion thereof, with the flap track fairing being open at intersection with the wing rear cavity, actuating means disposed in the flap fairing for actuating the rear flap, air dam means comprising:

a removable air dam which is structurally independent from the wing and positionable over the opening at intersection of the wing rear cavity and the flap track fairing to prevent passage of air therebetween;

mounting means for detachably securing said air dam to the wing; and,

wherein said air dam includes marginal portions extending around the periphery of the air dam for overlapping the margins of the opening between the rear wing cavity and the flap track fairing.

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**4,712,753**

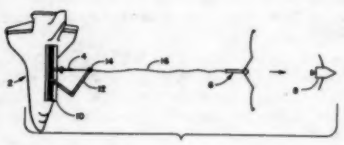
## SATELLITE RETRIEVAL APPARATUS

**Thomas R. Howard, PSC #2, Box 15195, APO San Francisco, Calif. 96367**

**Filed Feb. 11, 1987, Ser. No. 13,820**

**Int. Cl.[4] B64G *1/64***

**U.S. Cl. 244—161** **6 Claims**



1. Apparatus for capturing and retrieving objects from space comprising:

launching means and grappling means;

said launching means comprising a launch tube, a catch collar having a braking surface and being slideably positioned over said launch tube, reel means attached to said launch tube for storing a retrieval line threaded through said launch tube and attached to said grappling means, rotational drive means for rotating said grappling means when disposed on said launch tube, and pressurizing means for pressurizing said launch tube to propel said grappling means from said launching means;

said grappling means comprising a hollow shaft having a first and a second end and being slideably positionable over said launch tube, shaft rotation means affixed to said shaft adapted for engagement with said rotational drive

means, braking ring means formed on said shaft rotation means and aligned for engagement with said braking surface of said catch collar, a plurality of foldable deployment arms pivotally attached to said second end of said shaft, each of said plurality of arms having a catching line affixed to the free end thereof, each said catching line having bonding material at the extremity thereof distant from said arm, and a bumper pad adjacent said second end of said shaft.

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**4,712,754**

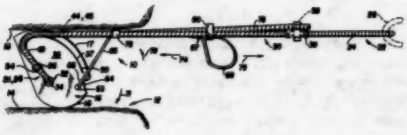
**ROCK CLIMBING ANCHOR**

**Malcolm J. Brodie, 7975 French Street, Vancouver, British Columbia, Canada V6P 4V8**

**Filed Jul. 7, 1986, Ser. No. 882,422**

**Int. Cl.[4] F16M** *13/00*

**U.S. Cl. 248—1** **20 Claims**



1. An anchoring device for releasably anchoring within a crack in a rock face, the crack having a pair of oppositely facing crack walls, the device including:

(a) a cam member having first and second convexly curved cam surfaces adapted to contact respective walls of the crack, the cam member having shoulder means and cable securing means,

(b) a load cable having an inner end portion cooperating with the cable securing means, an outer end portion adapted to cooperate with a separate link, and an intermediate portion disposed between the inner and outer end portions and cooperating with the shoulder means in such a manner as to rotate the cam member in a first direction when the cable is pulled so as to increase force acting on the crack walls, the inner end portion of the cable being located relative to the shoulder means so that the cable is deformed resiliently as the intermediate portion thereof engages at least a portion of the shoulder means, force from deforming the cable tending to rotate the cam means in the first direction so that forces generated by pulling the cable and deforming the cable over the shoulder means act in unison to rotate the cam so as to augment retention of the device within the crack,

(c) retraction means cooperating with the cam member and the load cable for rotating the cam member in a second direction which is opposite to the first direction, so as to decrease forces on the crack walls thus facilitating removal of the device from the crack.

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**4,712,755**

**HOSE SUPPORT**

**Daniel T. Robbins, and Melvin T. Stewart, both of 6728 Ben Ave., North Hollywood, Calif. 91606**

**Filed Oct. 20, 1986, Ser. No. 920,458**

**Int. Cl.[4] F16L** *3/00*

**U.S. Cl. 248—49** **1 Claim**

1. In combination with a storage tank outlet and a disposal tank inlet with a flexible hose interconnecting said outlet with said inlet, the improvement which comprises:

a pair of elongated rails having a flat bottom and opposite flat sidewalls arranged in sliding end-to-end relationship supporting said flexible hose;

mounting means coupling one end of said pair of rails to said outlet at said hose interconnection;

retainer means slidably connecting said pair of rails together so that said rails are co-extensive;

said mounting means includes a bracket having a sloped central section with outwardly extending flanges at each of its opposite ends;

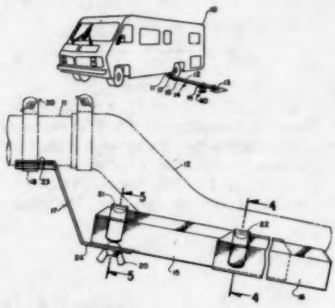
said end flanges angularly disposed with respect to said central section;

a clamp for detachably connecting a selected one of said bracket flanges to said hose coupled outlet;

an adjustable fastener coupling the other of said bracket flanges to the terminating end of said rail;

said retainer means includes hook means carried on the end of one rail slidably coupled to the other rail of said pair;

each of said rails of said pair are identically configured with opposite sloping sidewalls connected by a flat bottom section wherein the distance between the opposing surfaces of said sidewalls at their top edge is greater than the



distance between opposite sidewalls at the bottom section so that said hose is disposed between said sidewalls on said bottom section;

said other bracket flange mating the flat bottom section so that said bracket flange is pivotal about said adjustable fastener;

said retainer means are disposed on said sidewalls wherein each hook comprises an integral cut-out portion of said sidewall folded over upon itself to define a hook for slidably receiving said sidewall of the other sidewall of said pair;

a self-adjusting free-standing stanchion means disposed under said rails to support said rails and hose on the ground;

said stanchion means includes a V-base supporting a bracket on a pair of spaced apart rods, said bracket adapted to slide on said rods when free of weight thereon and being retained on said rods under weight of said rails and hose.

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**4,712,756**

**SHOCK CORDED TRIPOD STAND**

**Eugene A. Kester, Los Gatos; Scott P. Reeves, Campbell, and Danny Zemanek, Sunnyvale, all of Calif., assignors to Photoflex Products, Campbell, Calif.**

**Filed Apr. 23, 1986, Ser. No. 855,755**

**Int. Cl.[4] F16M** *11/32*

**U.S. Cl. 248—165** **11 Claims**

1. A shock corded tripod stand, for use in providing a means to hold aloft various lightweight objects, comprising:

three or more hollow segmented legs acting as support for the device , and to which the objects can be attached when desired;

a hollow segmented vertical member to which the objects are generally attached;

a spider assembly having a plurality of interconnected passages therethrough and including positions for receiving

said legs and vertical member, acting as the interface between the legs and the vertical member;

one or more elasticized shock cords extending within said legs, said vertical member, and said passages to connect

the device together, to provide tension during assembly of the device and to further maintain the device in its assembled position; and

affixing means to hold the objects, said means being attachable to either the legs or to the vertical member.

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**4,712,757**

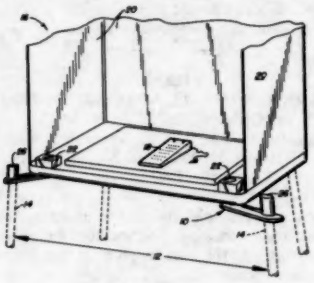
**PORTABLE VOTING BOOTH ADAPTER**

**John E. Ahmann, 1400 Duhig Rd., Napa, Calif. 94558**

**Filed Sep. 15, 1986, Ser. No. 906,941**

**Int. Cl.[4] F16M *11/16***

**U.S. Cl. 248—188** **8 Claims**



1. For use on a portable voting booth having a planar table with spaced apart front and rear legs and socket means near its front corners adapted to receive the upper ends of the front legs, an adapter device for widening the distance between the front legs to facilitate use of the voting booth by a person in a wheelchair, said adapter device comprising:

a generally cylindrical male connector member adapted to fit within a socket means of said table;

a support leg socket member oriented downwardly at a spaced apart distance from, and parallel to, said connector member, its lower end portion being coplanar with the lower end portion of said connector member;

said connector member and said support leg socket member being connected together by a horizontal flange portion, coplanar with the lower end portions of both said cylindrical member and said support leg socket member, whereby when a front leg is placed in said support leg socket member of an adapter device and its said connector member is placed in a said table socket means, the distance between the table front legs of the voting booth is widened.

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**4,712,758**

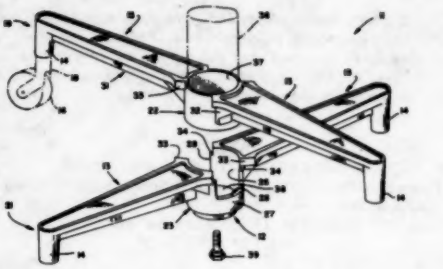
**NESTED HUB KNOCK-DOWN PEDESTAL**

**Casper Cuschera, 967 Industrial Parkway West, Hayward, Calif. 94544**

**Filed Jan. 27, 1986, Ser. No. 822,323**

**Int. Cl.[4] A47B *91/00***

**U.S. Cl. 248—188.7** **6 Claims**



1. In a support pedestal having a central hub and a plurality of arms extending outwardly from said hub at angular intervals therearound, said hub having means for receiving a vertically extending member which connects with a load that is to be supported by the pedestal and said arms having means for contacting a floor or other underlying surface, wherein the improvement comprises:

said hub being formed at least in part by first and second hub elements each having a pair of said arms extending outwardly from the hub element at opposite locations thereon, the first hub element being of greater diameter than the second hub element and having a first chamber with an opening at the top into which the second hub element is fittable in seated nesting relationship with the first hub element, the first hub element having a chamber wall with a pair of oppositely situated slots therein which extend downward from said opening and which are located between the arms of said first hub element and in which said pair of arms of said second hub element are received when said hub elements are in said nesting relationship, said second hub element having means for receiving said vertically extending member and for bearing the weight thereof, wherein said arms of said second hub element have horizontally extending side portions located to seat against the upper end of said first hub element in the regions thereof which are adjacent the upper ends of said slots when said hub elements are in said nesting relationship.

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**4,712,759**

**LOCK STRUCTURE FOR SEAT SLIDE DEVICE**

**Takayuki Sugama; Hiroshi Tabata, and Tadanori Honda, all of Tochigi, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed May 1, 1986, Ser. No. 858,400**

**Claims priority, application Japan, May 11, 1985, 60-100068; May 11, 1985, 60-100069**

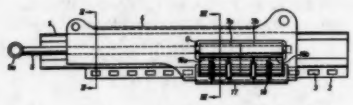
**Int. Cl.[4] F10M *13/00***

**U.S. Cl. 248—429** **7 Claims**

1. A lock structure for a seat slide device having a first and a second rail which are parallel to each other and mutually slidable, comprising:

a plurality of lock holes provided in the first rail along its longitudinal direction at an equal pitch of P;

at least three lock members, each having a lock tooth at a same phase position with respect to a lock tooth on each of the other lock members, which lock members are hinged to the second rail at an equal pitch z so as to have



the lock teeth independently engageable with the lock holes and jointly releasable from the lock holes; and

wherein $P=nz/(n=1)$ and $P/n+x<a$, where n is the number of the lock members, x is the width of each lock tooth and a is the width of each lock hole.

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**4,712,760**

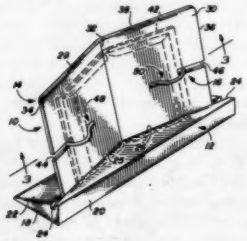
**BOOK REST WITH PAGE RETAINER**

**Howard J. Winter, 4131 E. Indian School Rd. #209, Phoenix, Ariz. 85018**

**Filed Oct. 14, 1986, Ser. No. 918,707**

**Int. Cl.[4] A47B *97/04***

**U.S. Cl. 248—451** **13 Claims**



1. A book rest for supporting books and magazines comprising:

(a) a base for resting placement on a substantially horizontal surface, said base having a front and having an upper surface;

(b) a prop structure extending from the upper surface of said base in a leaning attitude away from the front of said base, said prop structure including a pair of juxtaposed planar walls which extend oppositely from a central linear vertex and defines an included obtuse angle which opens toward the front of said base, said prop structure defining a front side which faces the front of said base and having an opposite back side;

(c) said prop structure defining a pair of slots each formed so as to extend inwardly from the distal edge of a different one of said pair of juxtaposed planar walls toward the central vertex thereof; and

(d) page retainer means mounted in the slots defined by said prop structure for releasably holding the pages of a book in an open position against the front side of said prop structure, said page retainer means comprising,

I. a pair of hooks each positioned in a different one of said pair of slots defined by said prop structure, each of said pair of hooks including,

i. a curved bight portion looped through its respective one of said pair of slots of said prop structure,

ii. a page engaging end extending integrally from one end of said bight portion toward the central vertex along the front side of said prop structure,

iii. a connection end extending integrally from the other end of said bight portion toward the central vertex along the back side of said prop structure said connection end being provided with at least one curved notch,

II. biasing means interconnecting said connection ends of said pair of hooks said biasing means is in the form of an elastic band connected between the curved notches of said pair of hooks.

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**4,712,761**

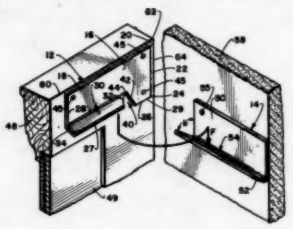
**PICTURE WALL HANGING ASSEMBLY**

**Edward T. Wassell, 3540 Ketch Ave., Oxnard, Calif. 93033**

**Filed Jan. 29, 1987, Ser. No. 8,565**

**Int. Cl.[4] A47G *1/16***

**U.S. Cl. 248—475.1** **16 Claims**



1. A wall hanging assembly for a picture frame comprising:

a self locating picture frame corner bracket comprising a planar body portion defined in part by a lower edge and straight upper edge, said upper edge forming a corner with a straight outer edge, said outer edge forming an intersection with a lower edge, a part of which flares outwardly and downwardly to form a flange, said flange having a first lateral edge angularly spaced from said body portion to form a notch opening, said bracket including picture frame attachment means said upper edge providing alignment means for other adjacent picture frames; and,

a wall track comprising an elongated web having an upturned lower end adapted to engage said bracket flange, said track including wall attachment means.

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**4,712,762**

**ADJUSTABLE REUSABLE ADAPTER SYSTEM FOR TEMPORARY ELECTRIC SERVICE**

**William O. Liedle, 2809 E. 27th St., Vancouver, Wash. 98661**

**Filed Aug. 14, 1986, Ser. No. 896,838**

**Int. Cl.[4] F16M *13/00***

**U.S. Cl. 248—533** **12 Claims**

1. An adjustable, reusable adapter system for maintaining a temporary electrical service in position above ground level at a building site prior to the installation of permanent electrical service, which comprises:

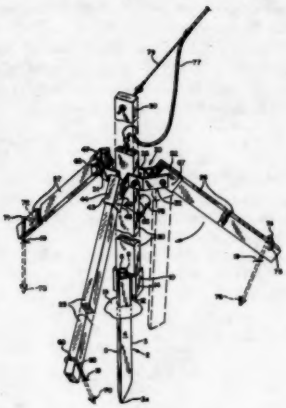
a. a vertical support member;

b. a base support means connected to a lower end of the vertical support member and including a stake means for securing said vertical support member into the underlying terrain;

c. bracket support means including a bracket angle assembly comprising a pair of front bracket angle means and a rear bracket angle means enclosing said vertical support means for clamping onto said vertical support member and adjustably movable in an upward and downward substantially vertical direction to a plurality of fixed positions and to a desired vertical position, along said vertical support member, for maintaining said vertical support member in a stable substantially vertical position regardless of the contour of the underlying terrain, and further including a plurality of sleeve means, having a substantially rectangular cross-sectional configuration, and spaced angularly apart about the vertical support member and pivotally

attached to said bracket angle assembly for pivotable movement in an angular arcuate path toward or away from said vertical member to a desired angular position with respect to said vertical support member; and

d. a plurality of bracing support members, having a substantially rectangular cross-sectional configuration, and having an upper end mounted within said sleeve means for adjustable movement to a desired angular position with respect to said vertical support member, for further maintaining said vertical members in a stable vertical position in spite of the contour of the underlying terrain.



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**4,712,763**

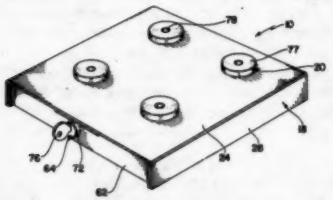
**SECURITY DEVICE FOR OFFICE MACHINES**

**Peter G. Leite, Seekonk, Mass., assignor to P.G.L. Industries, Inc., Seekonk, Mass.**

**Filed Dec. 29, 1986, Ser. No. 946,707**

**Int. Cl.[4] F16M** *13/00*

**U.S. Cl. 248—553** **8 Claims**



1. A security device for an office machine comprising a substantially closed housing having spaced top and bottom walls, said bottom wall being adapted to be secured on a mounting surface, said top wall having an aperture therein, a fastening element securable to the underside of said office machine and having a locking end portion which is receivable in said aperture when said fastening element is secured to said office machine, a plate slidably mounted in said housing between said top and bottom walls thereof and operable from the exterior of said housing when said fastening element is secured to said office machine and said locking end portion is secured in said aperture for sliding said plate between an engaged position wherein it engages said locking end portion to secure same in said aperture and a disengaged position wherein it is disengaged from said locking end portion and said fastening element is releasable from said housing, said housing and said plate being constructed so that said locking end portion is inaccessible from the exterior of said housing when said plate is in said engaged position thereof, and locking means for releasably retaining said plate in the engaged position thereof.

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**4,712,764**

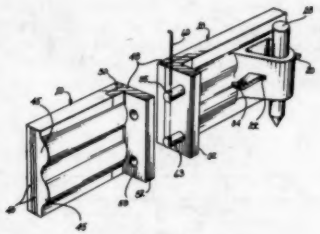
**FLEXIBLE FORMS**

**Lee Roy White, 1137 W. Emerald, Mesa, Ariz. 85202**

**Filed May 23, 1986, Ser. No. 867,233**

**Int. Cl.[4] E01C** *19/50*

**U.S. Cl. 249—6** **4 Claims**



1. A flexible form for use in concrete work, comprising:

an elongated flexible member means suitable for being bent and shaped during use as a concrete form for fitting onto the variable contour of a concrete structure, said flexible member means is adapted to rest on one of its longitudinal edges which extends lengthwise in a horizontal direction and having a substantially vertical side;

connecting member means having a first member and a second member each extending outwardly from a side opposite said vertical side and on opposite ends of the flexible member means, said first member having at least one protruding member protruding orthogonally therefrom, each protruding member having at least one aperture through which a pin member extends, said second member having at least one opening therein corresponding to the protruding member, whereby two or more flexible member means are connectable together by inserting the protruding member of a first member of one flexible member means into an opening of a second member of another flexible member means, and then inserting a pin member into an aperture in the protruding member;

a plurality of reinforcement means integral and therealong said elongated flexible member means;

a plurality of horizontal arcuate shaped rib means integral to said elongated flexible member means for providing strength thereto; and

a positioning bracket means integrally connected to said elongated flexible member means for holding said flexible form in place, said positioning bracket means comprises (a) a hollow body portion having slots passing therethrough and flanges extending therefrom; (b) a stake member means for removably inserting inside said hollow body portion; and (c) a wedge means for slidably engaging said slots and operably securing said stake member means inside said hollow body portion, said wedge mans has an extension for preventing said wedge means from sliding out of the slots.

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**4,712,765**

**APPARATUS FOR PRODUCING COATED PANELS**

**Iraj Sabet, Bassecourt, Switzerland, assignor to Stella Werke AG, Bassecourt, Switzerland**

**Filed Dec. 3, 1985, Ser. No. 804,187**

**Claims priority, application Switzerland, Dec. 4, 1984, 5761/84**

**Int. Cl.[4] B29C** *33/10, 33/14, 39/10, 45/14*

**U.S. Cl. 249—91** **3 Claims**

1. In a casting mold for use in producing panels each having

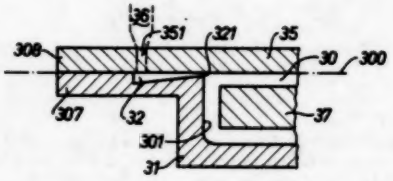
an integral coat of a cross-linked polymer matrix, said mold consisting essentially of:

(A) a lower or tray portion having an inner bottom face, at least four times side faces, and an essentially continuous rim face adjoining said inner side faces;

(B) an upper or lid portion having a face that is essentially co-extensive with said tray portion to form, with said inner sides of said tray portion, a mold cavity that is closed by juncture of said rim face of said tray portion and of a coextensive part of said lid portion, said lid portion having means for supporting a panel core at a distance from said lid face;

(C) an inlet opening for introducing a liquid resin composition into said mold and an outlet opening for permitting air to escape from said mold when said liquid resin composition is introduced through said inlet opening;

the improvement consisting essentially of:




(D) an elongated recess substantially aligned with one of said inner side faces of said tray portion and arranged adjoining thereto within an area of said juncture of said rim face of said tray portion and said co-extensive part of said lid portion, said recess being shaped to form an elongated and essentially prismatic space when said rim face is in said juncture with said co-extensive face portion of said lid; said prismatic space having an edge portion extending over at least about 50% of said one inner side tace and forming an elongate slit shaped nozzle means communicating with said mold cavity when said casting mold is closed, and

(E) said inlet opening ending in said prismatic space for feeding said liquid resin composition into said prismatic space so as to form at said slit-shaped nozzle means a smooth and laminar film for filling said mold cavity with said liquid resin composition substantially without turbulence of flow.

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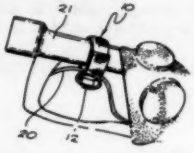
**4,712,766**

## EASY SQUEEZE NOZZLE HOLDER

**Caradoc Ehrenhalt, Los Angeles, Calif., assignor to Easy Use Products, Inc., Los Angeles, Calif.**

**Filed Mar. 23, 1987, Ser. No. 28,735**
**Int. Cl.[4] G05G *5/06*; F16K *31/00***
**U.S. Cl. 251—90** **6 Claims**




1. A device for holding a mechanical structure such as the operating handle of a fuel delivery nozzle, comprising: an elongated flexible body of material;

a flexible cross member secured thereto;

mating adjustable securing means on opposite portions of both said body and said cross member whereby the cross member may be formed into one loop and said body formed into a second loop, each of said loops of adjustable size;

the cross member dimensioned to form a finger sized loop wherein an index finger is positioned, overlying the flexible body of material and a loop being formed and secured about the index finger; and wherein the flexibility of the body of material allows the body to be naturally formed into a loop around the handle of a fuel delivery nozzle by grasping the handle, thereby bringing the adjustable securing means on said body into mating engagement for holding the handle in an operated position.

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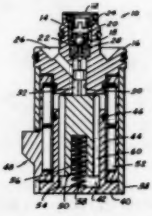
**4,712,767**

## SOLENOID CONTROL VALVE

**Gerald L. Losser, Gloucester, and Richard D. Weaver, Williamsburg, both of Va., assignors to Allied Corporation, Morris Township, Morris County, N.J.**

**Filed Oct. 29, 1986, Ser. No. 925,006**
**Int. Cl.[4] F16K *31/06***
**U.S. Cl. 251—129.14** **3 Claims**



1. In an adaptive braking system having a solenoid operated control valve for receiving fluid at one end thereof, a valve means adjacent the one end and biased closed, a plunger means reciprocally actuated to open the valve means, a solenoid means having an armature normally biased into contact with the plunger means, the improvement comprising:

the armature having at least one aperture axially extending for allowing passage of fluid therethrough from one end thereof to the other end when the armature is moved by the energizing of the solenoid means for effecting the opening of the valve means and;

circular groove means at one end thereof in contact with the plunger means and intersecting said aperture for reducing the adhesion between the armature and the plunger.

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**4,712,768**

## QUARTER TURN VALVE

**Leroy E. Herr; Allan K. Shea, both of Erie, and Timothy E. Kunkle, McKean, all of Pa., assignors to White Consolidated Industries, Inc., Cleveland, Ohio**

**Continuation of Ser. No. 747,980, Jun. 24, 1985, abandoned. This application Oct. 23, 1986, Ser. No. 922,782**
**Int. Cl.[4] F16K *1/22***
**U.S. Cl. 251—305** **7 Claims**

7. A high performance butterfly control valve which comprises:

(a) a valve housing,

(b) a generally disc-shaped vane, including an outer periphery,

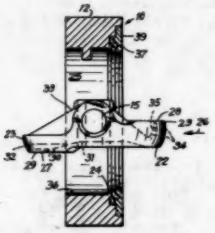
(c) said disc-shaped vane being mounted for selective controlled rotation in said valve housing, whereby a first portion of said outer periphery is rotated in the downstream direction, and a second portion of said outer periphery is rotated in the upstream direction,

(d) said disc-shaped vane being rotated through a quarter turn of rotation, whereby the outer periphery is in a sealed

relation with the valve housing at 0° of rotation, and the vane extends generally parallel to the direction of fluid flow through the valve housing at 90° of rotation, (and)

(e) a first projection extending from said vane about the first portion of the outer periphery,

(f) said first portion and said first projection each being in close proximity to the valve housing at least during a predetermined number of degrees of vane rotation whereby said close proximity inherently controls fluid flow about said first projection and said first portion during said predetermined number of degrees of vane rotation, and



(g) a second projection extending from said vane about the second portion of the outer periphery,

(h) said first projection being formed to a generally streamlined, smoothly contoured configuration and to a length of extension which is minimized to the extent permitted by the inherent control of said close proximity,

(i) said first projection having a length of extension which is less than the length of extension of said second projection, thereby providing a minimal, turbulence free obstruction to fluid flow when said vane is at 90° of rotation.

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**4,712,769**

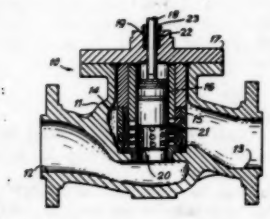
**HIGH TEMPERATURE BALANCED VALVE TRIM**

**Roger E. Johnson, Girard, Pa., assignor to White Consolidated Industries, Inc., Cleveland, Ohio**

**Filed Aug. 29, 1986, Ser. No. 902,310**

**Int. Cl.[4] F16K** *15/00*

**U.S. Cl. 251—324** **11 Claims**



1. A valve plug for use in a fluid control valve, which comprises:

(a) a main valve plug member,

(b) a seal forming member mounted in an axially stacked relation to said main valve plug member whereby said seal forming member and said main valve plug member together form a generally smooth. continuous outer surface,

(c) said seal forming member comprising

(i) an outer element made from a durable material having predetermined resilient characteristics and including an outer wall member forming said generally smooth continuous outer surface with said main valve plug and two, spaced wall sections, each being connected at a first end to said outer wall member and having a second free end,

(ii) the connected ends of said two wall sections and said outer wall member being arranged and configured with respect to one another whereby there is a section of minimum wall thickness arranged within said outer wall member at a position between said spaced, two wall sections,

(iii) said outer wall member and said two, spaced wall sections defining an interior space within said outer element,

(iv) a packing material tightly received and compressed within said interior space of the outer element, and

(d) means for compressing said seal forming member upon shut off of the control valve whereby the free ends of the two wall sections are resiliently crimped toward one another to compress and urge the packing material toward the section of minimum thickness of the outer wall to resiliently deform said outer wall into an outwardly extending bulge formation, which bulge formation is arranged to contact said control valve to thereby form a leak tight seal around the valve plug.

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**4,712,770**

**ELECTRICAL TENSIONING DEVICE FOR ORTHOPEDIC ADJUSTMENT MEANS**

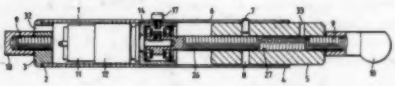
**Hans Wiederkehr, Ifangstrasse 107, Rümlang, Switzerland**

**Filed Apr. 29, 1985, Ser. No. 728,207**

**Claims priority, application Switzerland, Apr. 30, 1984, 2106/84**

**Int. Cl.[4] B66F** *3/08*

**U.S. Cl. 254—98** **7 Claims**



1. An orthopedic tensioning device comprising a hollow elongated housing having a slot therein; a lift member guidably mounted in said housing at one end thereof for reciprocal movement therein, said lift member having guide means receivable in said slot in said housing so as to prohibit said lift member from rotating while guiding said lift member for reciprocal movement; motor means mounted in said housing at the other end thereof for driving said lift member, said motor means comprising an electric motor, a gear reduction means connected to said electric motor and an output shaft from said gear reduction means; transmission means between said output shaft and said lift member, said transmission means including a worm gear comprising a threaded spindle having one end threadably received in a bore provided in said lift member and the other end connected to said output shaft of said gear reduction means; and bearing means provided in said housing between said electric motor and said worm gear about said output shaft for absorbing oppositely acting axial forces, said bearing means being situated in a bushing fitted on the inner wall of said housing including means external of said housing engaging with said bushing for releasably securing said bearing means in said housing.

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**4,712,771**

**WALLBOARD JACK**

**Kevin S. Donnelly, 5842 Comanche Dr., San Jose, Calif. 95123, and Ralph H. Donnelly, 425 Hershner Dr., Los Gatos, Calif. 95030**

**Filed Apr. 21, 1986, Ser. No. 854,020**

**Int. Cl.[4] B66F** *3/00*

**U.S. Cl. 254—131** **1 Claim**

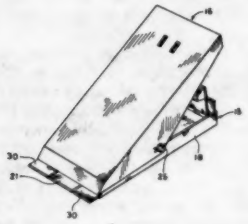
1. A jack for positioning and holding wallboard and the like comprising:

a base;

a lever assembly having first and second ends;

means for pivotally mounting the lever assembly on said base so that downward pressure on the first end of said lever assembly will raise the second end thereof;

ratchet means for holding said lever assembly with the second end elevated after pressure is applied to said first end;



releasable locking means actuable for releasing said ratchet means and allowing said second end to pivot downward; and

means to disable said locking means to prevent the ratchet from holding said lever assembly with the second end elevated.

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**4,712,772**

**POWER HYDRAULIC GEAR**

**Sergei B. Negrutsky, 43, kv. 121, Karaganda, bulvar Mira; Sergei B. Klimov, Sovetsky, 60/2, kv. 14, Karaganda, prospekt; Boris F. Negrutsky, 51, kv. 12, Karaganda, ulitsa Lenina, and Vladimir G. Churkin, 14, kv. 12, Karaganda, ulitsa Kostenko, all of U.S.S.R.**

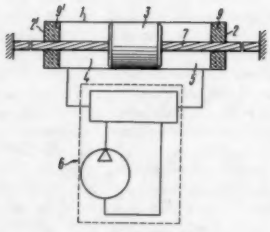
**PCT No. PCT/SU84/00056, § 371 Date Dec. 19, 1985, § 102(e) Date Dec. 19, 1985, PCT Pub. No. WO85/04933, PCT Pub. Date Nov. 7, 1985**

**PCT Filed Nov. 2, 1984, Ser. No. 824,010**

**Claims priority, application U.S.S.R., Apr. 24, 1984, 3732434**

**Int. Cl.[4] B66D** *3/18;* **B25B** *25/00;* **F16H** *27/02*

**U.S. Cl. 254—264** **4 Claims**



1. A power hydraulic gear comprising a hollow cylindrical housing (1) with end faces (2, 2'), said housing accommodating thereinside a piston (3) dividing the housing space into a direct stroke chamber (4) and a return stroke chamber (5) communicated alternately with a source (6) of pressurized fluid medium for effecting efficient translation movement of the piston along a traction guide member (7) passed therethrough, and means (8) for engaging the piston (3) with the traction guide member (7), characterized in that the traction guide member (7) is a rope passed through seals (9, 9') fitted at the end faces (2, 2') of the housing (1) and through the piston (3) which accommodates the means (8) for engaging with the rope, said means adapted to engage said rope upon delivery of pressurized fluid medium to one of the chambers of the housing and disengage from the rope upon delivery of pressurized fluid medium to the other one of the housing chambers, characterized in that the seals (9, 9', 9'') of the housing end faces and of the piston (3) are fashioned as chambers formed in each end face (2, 2') and in the piston (3) and filled with a viscoelastoplastic material, said chambers being provided with means for developing in them a pressure, said means being fashioned as step-like pistons (21, 21', 12) fitted in the chambers formed in the end faces (2, 2') and piston (3) and communicating with said direct and return stroke chambers.

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**4,712,773**

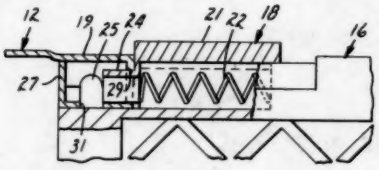
**MULTIPLE PANEL PLAY AREA**

**Donald A. Larson, Circle Pines, Minn., assignor to North States Industries, Inc., Minneapolis, Minn.**

**Filed Apr. 24, 1987, Ser. No. 42,028**

**Int. Cl.[4] E04H** *17/16*

**U.S. Cl. 256—25** **7 Claims**




1. In a multiple panel unit for creating a play area for young children in which each panel has a rigid rectangular frame and is connected to an adjacent panel by a hinge structure at the top and bottom of the panels, permitting the panels to be pivoted with respect to each other at the hinge, the improvement comprising:

the top of a first of two adjacent panels having a releasable retaining means for releasably retaining one end of the hinge structure connecting said two panels and said one end of the hinge structure being complementarily formed for being retained by said releasable retaining means, said releasable retaining means including a spring loaded slide mechanism for retaining the hinge end when the slide mechanism is first held in an open position against the force of the spring and the hinge end is positioned in its retention position and the slide mechanism is then released and urged to its retention position by said spring,

the bottom of the second of said two adjacent panels and the corresponding end of the bottom hinge structure being formed with a pin and a mating recess that are matable in a direction parallel to the hinge pivot axis.

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**4,712,774**

**DEVICE FOR THE MELTING OF LIGHT METALS**

**Raymond Louis, Montmagny, France, assignor to Gaz de France, Paris, France**

**Filed Dec. 20, 1985, Ser. No. 811,787**

**Claims priority, application France, Dec. 20, 1984, 84 19543**

**Int. Cl.[4] F27B** *14/02*

**U.S. Cl. 266—155** **5 Claims**

1. Apparatus for melting and holding light metal alloy loads in the molten state, the apparatus including a furnace comprising:

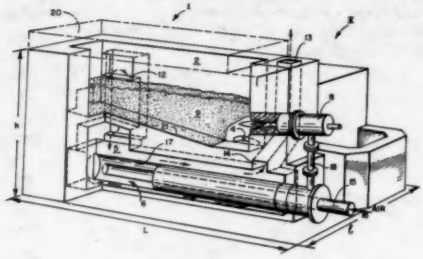
a first chamber positioned at a first level for loading the metal alloy, the first chamber having a first burner for melting the alloy into a molten bath;

a second chamber, having a second burner, positioned at a level lower than the first chamber for holding the molten bath, the second burner maintaining the molten bath in the molten state for tapping;

a channel connecting the first chamber to the second chamber for allowing the molten bath to flow from the first chamber to the second chamber;

an exhaust means connected to the first and second chambers for evacuating combustion fumes produced in each of the chambers; and

a heat exchanger having air for combustion of the burners



inputted thereto, the heat exchanger being positioned substantially under the first chamber and adjacent to an internal lateral wall of the second chamber for heating the combustion air with combustion products produced in the chambers.

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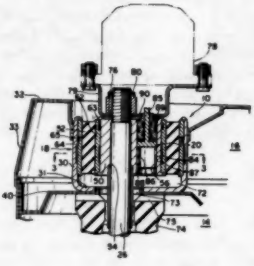
**4,712,775**

## CONSTRUCTION OF CONTROL VALVE FOR AIR SUSPENSION

**Shuuichi Buma, Toyota, and Osamu Horiyama, Kani, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed Feb. 26, 1986, Ser. No. 833,068**
**Claims priority, application Japan, Feb. 26, 1985, 60-25514[U]**
**Int. Cl.[4] F16F *3/08***
**U.S. Cl. 267—220** **6 Claims**



1. A control valve in combination with an air suspension assembly having main and auxiliary air chambers comprising:

boundary means disposed between said main air chamber and said auxiliary air chamber and provided with passage means for communicating between both air chambers, the path including a first passage, a second passage having a bore smaller than that of the first passage and a third passage;

a sound muffling perforated member having a plurality of perforations provided solely in relation witgh said second passage of said passage means for muffling noise generated by air flow therethrough; and

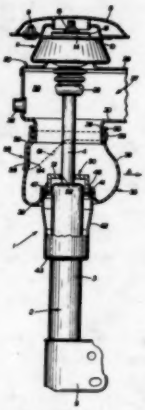
a valve body selectively interconnecting said first and second and said first and third passages for affording and interrupting communication between said main air chamber and said auxiliary air chamber wherein each of said air chambers are communicated through one of said first and second passages when said valve body is in a predetermined position and the other of said first and second passages is closed by said valve body.

**4,712,776**

## AIR SPRING SUSPENSION SYSTEM

**Wayne H. Geno, Cicero, Ind., and David A. Weitzenhof, Akron, Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio**

**Filed Jul. 14, 1986, Ser. No. 885,124**
**Int. Cl.[4] F16F *9/04***
**U.S. Cl. 267—64.21** **20 Claims**



1. An improved air spring suspension system for vehicle including:

(a) a fluid shock absorber strut having an outer cylinder and a reciprocal piston rod;

(b) first attachment means for securing the cylinder to a first vehicle support system;

(c) second attachment means for securing the piston rod to a second vehicle support structure spaced from the first vehicle support structure;

(d) a fluid pressure chamber comprising an annular canister mounted against movement relative to the piston rod, and a flexible sleeve sealingly connected to and extending between said canister and cylinder, said pressure chamber adapted to contain a supply of pressurized fluid with said piston rod extending through said pressure chamber; and

(e) a rigid retention member having a sidewall surrounding a predetermined portion of the flexible sleeve to restrain outward expansion of a first sleeve portion while permitting free expansion of a second sleeve portion to place a lateral force on the shock absorber strut.

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**4,712,777**

## FLUID FILLED VIBRATION ISOLATOR HAVING PRECISELY ADJUSTABLE DYNAMIC OPERATING CHARACTERISTICS

**H. Timothy Miller, Erie, Pa., assignor to Lord Corporation, Erie, Pa.**

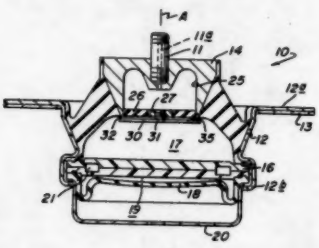
**Filed Aug. 25, 1986, Ser. No. 900,167**
**Int. Cl.[4] F16F *13/00, 9/34***
**U.S. Cl. 267—140.1** **8 Claims**

1. In a fluid filled vibration isolator having compliant means providing a variable volume working fluid chamber displaceable in response to vibrations of the working fluid and an inertia track passageway cooperable therewith to provide certain dynamic operating characteristics, a control fluid chamber adjacent to said working fluid chamber for containing a control fluid, and flexible means separating said control fluid chamber from said working fluid chamber while normally providing a portion of the overall compliance of said working fluid chamber, the improvement comprising: means movable in response to a control for selectively either permitting said flexible means to flex or preventing said flexible means from

flexing relative to said control fluid chamber in response to dynamic pressure variations in said working fluid chamber for thereby affecting the contribution of the flexible means to the overall compliance of said compliant means, whereby certain dynamic operating characteristics of the vibration isolator can be precisely modified wherein

(a) said movable means includes a shutter panel disposed alongside said flexible means and movable in relation thereto;

(b) said shutter panel is disposed intermediate said control fluid chamber and said working fluid chamber and is



movable between extended and retracted positions in said working fluid chamber; and

(c) said shutter panel is stiff relative to said flexible means and is at least coextensive in area therewith, and including abutment means carried by said complaint means around said flexible means, said abutment means being engageable by said shutter panel in response to retraction thereof toward said control fluid chamber from its extended position in said working fluid chamber for completely isolating said flexible means from dynamic pressure variations occurring in said working fluid chamber.

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**4,712,778**

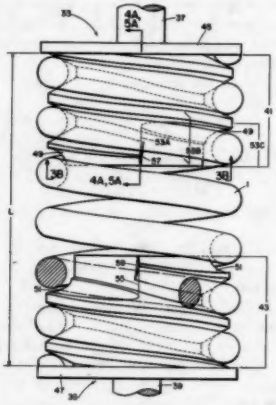
**HELICAL SPRING HOLDER ASSEMBLY**

**Wyatt S. Newman, New York, N.Y., assignor to North American Philips Corporation, New York, N.Y.**

**Filed Dec. 21, 1981, Ser. No. 332,993**

**Int. Cl.[4] F16F *1/06, 1/12***

**U.S. Cl. 267—170** **8 Claims**



1. A spring assembly comprising at least one helically-threaded spring holder and a helically-wound spring mounted thereon, the thread on the spring holder having a tension bearing side against which the spring bears when it is in tension and a compression bearing side against which the spring bears when it is in compression, characterized in that the spring holder has a groove formed in a portion of at least one of said sides of its thread over a predetermined circumferential length starting at the end of the thread where the spring engages the spring holder, said groove relieving the spring from restriction against axial movement by said portion of the side, said length being chosen to establish a predetermined ratio of the number of active spring coils in tension to the number of active spring coils in compression.

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**4,712,779**

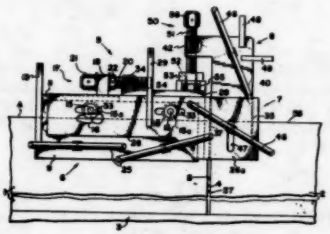
**WELDING FIXTURE**

**Timothy C. Dearman, P.O. Box 937, Pearland, Tex. 77581**

**Filed Dec. 2, 1981, Ser. No. 326,485**

**Int. Cl.[4] B25B *1/20***

**U.S. Cl. 269—43** **12 Claims**



1. Apparatus for use in relatively positioning a pair of plate-like members for welding, said apparatus comprising a first clamp unit for attachment to one of said members; first anchor means carried by said first clamp unit for securing the latter to said one of said members; a second clamp unit for attachment to the other of said members; second anchor means carried by said second clamp unit for securing the latter to the other of said members; means mounting one of said clamp units on the other of said clamp units for relative movement therebetween in each of two mutually normal planes; and adjusting means interconnecting said first and second clamp units and operable to effect relative movement therebetween in either of said planes while such units are secured to their respective members.

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**4,712,780**

**HYDROPNEUMATIC SPRING SUSPENSION DEVICE**

**Reinhold Ficht, Kirchseeon, and Walter Vilsmeier, Grossfendorf, both of Fed. Rep. of Germany, assignors to Ficht GmbH, Fed. Rep. of Germany**

**PCT No. PCT/DE85/00190, § 371 Date Mar. 14, 1986, § 102(e) Date Mar. 14, 1986, PCT Pub. No. WO85/05605, PCT Pub. Date Dec. 19, 1985**

**PCT Filed May 31, 1985, Ser. No. 825,284**

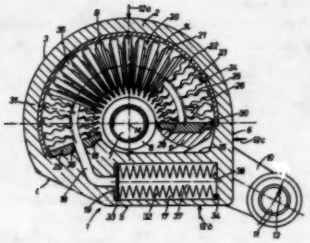
**Claims priority, application Fed. Rep. of Germany, Jun. 1, 1984, 3420557**

**Int. Cl.[4] B60G *11/26***

**U.S. Cl. 267—256** **14 Claims**

1. Hydropneumatic spring suspension device for a vehicle for insertion between suspension components movable in relation to each other, comprising a housing having a spring bellows therein filled with a hydraulic medium and hydraulically connected by a channel to a chamber filled with said hydraulic medium and containing a pneumatic spring deformable under hydraulic pressure, one end of said bellows being supported in said housing and connected at its other end through an abutment connected to one of said suspension components, said bellows comprising a plurality of individual segments fixed together along the arc of a circle and having an eccentric passage passing therethrough, each of said segments having walls with beads thereon, said walls on adjacent segments

being joined to each other around said eccentric passage and forming a liquid tight joint between said segments, said beads on the adjacent walls of said segments nesting into each other



when said bellows is compressed and interlocking said walls, said bellows being bent substantially in the shape of an arc of a circle, said abutment connected at said other end of said bellows being movable along a circular arc.

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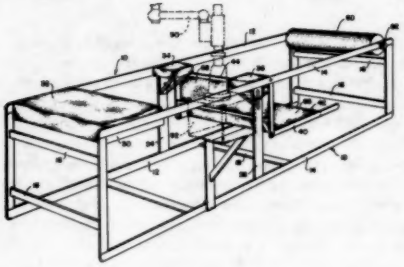
**4,712,781**

## OPERATING TABLE FOR MICROSCOPIC LUMBAR LAMINECTOMY SURGERY

**Robert S. Watanabe, Los Angeles, Calif., assignor to Watanabe Orthopedic Systems, Inc., Los Angeles, Calif.**

**Filed May 12, 1986, Ser. No. 861,829**
**Int. Cl.[4] A61G *13/00***
**U.S. Cl. 269—322** **4 Claims**



1. An operating table for microscopic lumbar laminectomy, and the like, comprising: a frame-like structure including first and second elongated spaced and parallel side members defining a rectangular-shaped open top; a shelf-like member mounted on said side members at one end of said open top for supporting the chin and chest of a patient lying face down on the table; a pair of brackets mounted on the frame-like structure adjacent to said open top, said brackets being spaced laterally from one another and spaced longitudinally from said shelf-like member for supporting the iliac crests, means for vertically adjusting said brackets on said first and second side members, respectively of the patient so that the weight of the patient is supported by the iliac crests and by the lower part of the chest; and support means pivotally coupled to said side members at the open top of said frame structure on the remote side of said brackets from said shelf-like member and movable to a first position to provide a flat surface at said open top of said frame-like structure for receiving a patient on the table, and to a second position to provide a support for the patient in a kneeling position, said support means including first and second panels which extend across the open top of said frame-like structure in co-planar relationship with one another when the support means is in said first position, and in which said first panel assumes a vertical position and said second panel assumes a horizontal position displaced down from the open top of said frame-like structure when said support means is in said second position.

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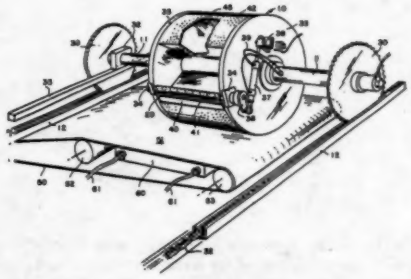
**4,712,782**

## METHOD AND APPARATUS OF SEPARATING AND TRANSPORTING FABRIC PIECES

**Anthony D. Mathias, Toorak, Australia, assignor to Dunlop Olympic Limited, Victoria, Australia**

**PCT No. PCT/AU84/00169, § 371 Date May 7, 1985, § 102(e) Date May 7, 1985, PCT Pub. No. WO85/01037, PCT Pub. Date Mar. 14, 1985**
**PCT Filed Sep. 7, 1984, Ser. No. 750,608**
**Claims priority, application Australia, Sep. 7, 1983, PG1303**
**Int. Cl.[4] B65H *3/06, 3/44, 5/00***
**U.S. Cl. 271—21** **5 Claims**



1. An apparatus for separating a piece of limp fabric from a stack of fabric pieces and transporting said piece to a distant receptor location comprising in combination

(A) a carrier member having a generally cylindrical outer surface,

(B) means for moving said carrier member by rotation from a position adjacent said stack of fabric pieces to a position adjacent said receptor location,

(C) means to establish pressure contact between said stack of fabric pieces and the periphery of said carrier member,

(D) means to rotate the carrier member relative to said stack of fabric pieces to thereby separate one piece of limp fabric from the top of said stack,

the improvement which comprises

(1) said generally cylindrical carrier member having an elongated opening in its external surface which is parallel to the axis of the carrier member,

(2) said generally cylindrical carrier member being provided with an elongated friction roller that is positioned in said elongated opening so that a portion of the outer periphery of said friction roller extends outwardly beyond the outer circumference of said generally cylindrical carrier member and so that an elongated gap is left between said elongated opening in said carrier member and said elongated friction roller, the axis of said carrier member and the axis of said friction roller being in fixed positions relative to each other,

(3) means to rotate said elongated friction roller in a direction opposite to the direction of rotation of said carrier member so that rotational movement of the elongated friction roller over the top of said stack will withdraw the front marginal portion of the top piece of fabric in the stack and both cause it to form a fold and then force this fold into said elongated gap,

(4) the width of said elongated gap that is adjacent said elongated friction roller being selected relative to the fabric being handled so that when the fold formed by rotating said elongated friction roller is forced into said elongated gap the elongated gap will exert a sufficient

gripping force on the fold to retain the fold in that position in the elongated gap, and

(5) suction means associated with a portion of the external surface of said carrier means which insures that the remainder of the fabric piece that is not held in said elongated gap will be retained against the exterior surface of the generally cylindrical carrier means.

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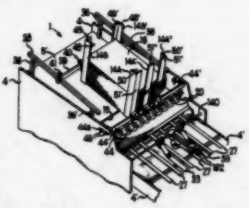
**4,712,783**

**SUCTION SHEET SEPARATOR WITH ADJUSTABLE FEED RESTRAINT AND STACK CONFINEMENT**

**Martin Selak, 578 S. Warrington Rd., Des Plaines, Ill. 60016**

**Division of Ser. No. 273,573, Jun. 15, 1981, Pat. No. 4,437,657.**
**This application Feb. 29, 1984, Ser. No. 584,792**
**Int. Cl.[4] B65H** *9/08, 3/08*
**U.S. Cl. 271—100** **7 Claims**



1. In feeding apparatus for feeding sheet material one at a time from the bottom of the stack of the same, said apparatus including a horizontal support for a stack of sheets, stacking means for retaining on said horizontal support a vertical stack of sheet material, said horizontal support terminating short of the front end of the stack to provide a feed opening exposing the front end portion of the bottom sheet in the stack, and means for withdrawing the bottommost sheet from the bottom of the stack through said feed opening and including suction cup means for engaging the bottom surface of the exposed end portion of the bottommost sheet in the stack and by force of suction therefrom pulling the sheet downwardly from the stack through the feed opening, the improvement wherein said stacking means includes upstanding front wall means for engaging the front end of said stack of sheets, and means for supporting said front wall means for longitudinal front to rear movement to varying degrees relative to the horizontal support to vary the relative position between the front margin of said stack of sheets abutting said front wall means and the suction cup means.

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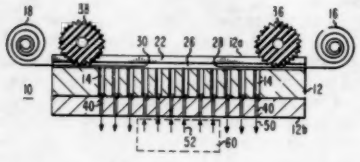
**4,712,784**

**ADJUSTABLE VACUUM PAD**

**Ross M. Carrell, Cinnaminson, N.J., assignor to RCA Corporation, Princeton, N.J.**

**Filed May 31, 1985, Ser. No. 739,918**
**Int. Cl.[4] B65H** *3/08*
**U.S. Cl. 271—108** **7 Claims**



1. A vacuum pad comprising in combination a block of material having a plurality of spaced apart orifices along one surface thereof each of said orifices being connected to a common plenum and having a connecting passageway to an orifice to the atmosphere;

means connected to said plenum for normally creating a reduced pressure relative to atmospheric pressure at said orifice; and

means for covering said orifice to the atmosphere for creating elevated pressure at selected ones of said orifices.

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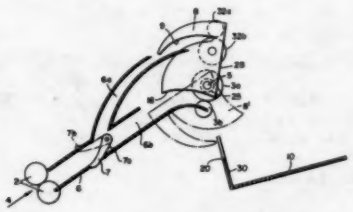
**4,712,785**

**SHEET STACKING APPARATUS**

**Denis J. Stemmle, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Apr. 11, 1986, Ser. No. 850,452**
**Claims priority, application United Kingdom, Apr. 12, 1985, 8509462; Apr. 23, 1985, 8510275**
**Int. Cl.[4] B65H** *29/00*
**U.S. Cl. 271—187** **11 Claims**



1. Apparatus for stacking sheets fed seriatim from an inlet into a collection tray comprising first and second sets of coacting driven output roller pairs associated respectively with alternative inverting and non-inverting copy sheet paths, coaxial discs each having an arcuate slot communicating at one end with the disc periphery, and diverter means selectably movable between first and second positions, wherein in the first position the diverter means is arranged to direct each sheet issuing from the inlet so that its lead edge enters the slots in the discs, which slots guide the sheet to the first set of output rollers, the discs being adapted to rotate as the sheet is advanced by the first set of output rollers so that the sheet is guided by said slots along a substantially semi-circular path and the sheet is thereby inverted before it exits the slots to be received inverted in the collection tray, which is disposed on the side of the disc opposite said inlet, and in the second position the diverter means directs the lead edge of each sheet issuing from the inlet to the second set of output rollers which feed the sheet without inversion directly into the collection tray.

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**4,712,786**

**COPY SHEET OFFSETTING DEVICE**

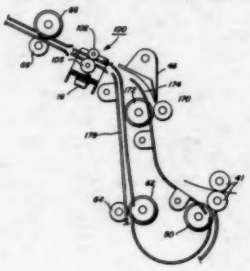
**John H. Looney, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 18, 1985, Ser. No. 810,453**
**Int. Cl.[4] B65H** *31/00*
**U.S. Cl. 271—207** **15 Claims**

1. In a printing apparatus having a page image transfer area and an output area and adapted for printing page image information onto copy sheets and feeding the copy sheets out of the output area into a sorter with the copy sheets being offset in the sorter in sets, the improvement, comprising:

offsetter means positioned within the printer between said page image transfer area and said output area and adapted

to translate copy sheets in route to the sorter alternately front and rearward during the time each copy sheet is



within said offsetter means such that offset sets of copy sheets are attained in the sorter.

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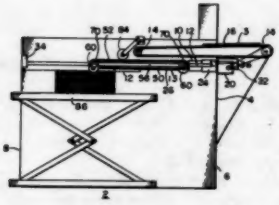
**4,712,787**

## STACKING APPARATUS

**Raymond A. Princiotta, Sr., 208 N. Concord Ave., Havertown, Pa. 19083, and Antonio Salvucci, 131 Windswept Dr., Feasterville, Pa. 19047**

**Filed Apr. 14, 1986, Ser. No. 851,107**
**Int. Cl.[4] B65H *29/54***
**U.S. Cl. 271—311** **7 Claims**



1. An apparatus for stacking pieces of cloth which comprises: a frame;

a conveyor means, connected to said frame, adapted to receive a plurality of pieces of cloth in sequence; a reciprocating carriage connected to said frame, positioned below said conveyor means and adapted to move parallel with respect to the longitudinal axis of said conveyor means, so that cloth pieces are sequentially deposited on said reciprocating carriage and then are deposited on a receiving table that is situated below the reciprocating carriage; and

a stationary cross member having one or more arms extending therefrom and supporting one way rotatable wheels, positioned above said reciprocating carriage and located so that the wheels touch and guide pieces of cloth as the pieces of cloth are sequentially deposited on said reciprocating carriage, and located so that the wheels stop and grip the pieces of cloth when the reciprocating carriage changes direction, so as to remove the pieces of cloth from the reciprocating carriage surface and so as to stack the cloth on the receiving table.

7. A method of stacking pieces of cloth which comprises:

conveying pieces of cloth, by means of conveyor means, to a reciprocating carriage at a predetermined rate; causing the reciprocating carriage to move horizontally at the same rate and in the same direction as the conveyor means;

guiding the pieces of cloth off the reciprocating carriage so that they form an orderly stack on a receiving table, by means of clutch wheels that move only in a clockwise direction as they are guiding the cloth on the reciprocating carriage and that stop moving, and, in doing so, grip the cloth when the reciprocating carriage changes direction so as to move rearward;

moving said reciprocating carriage rearward after it receives a piece of cloth from the conveyor means and after the cloth is guided off the reciprocating carriage so that the reciprocating carriage is in a position to move forward again to received the next piece of cloth; and

moving said receiving table downward so that the top of the stack of cloth formed on the receiving table is kept at a predetermined distance from the horizontally moving reciprocating carriage's surface.

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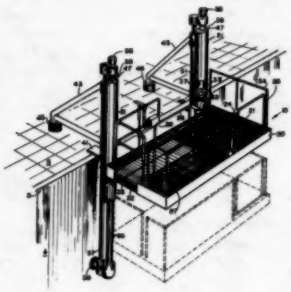
**4,712,788**

## AQUATIC EXERCISE APPARATUS

**Charles H. Gaudreau, Jr., 2736 Octavia St., New Orleans, La. 70115**

**Filed Oct. 8, 1986, Ser. No. 916,888**
**Int. Cl.[4] A63B *23/06***
**U.S. Cl. 272—69** **18 Claims**



1. An aquatic exercise apparatus comprising:

a platform means;

vertical-movement means for vertically moving said platform means between a first position above a body of water, and a second position in which at least a portion of said platform means is disposed in a body of water;

means for mounting said aquatic exercise apparatus adjacent a body of water; and

a stationary exercise device positioned on said platform means.

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**4,712,789**

## CYCLE EXERCISERS

**Frank P. Brilando, Niles, Ill., assignor to Schwinn Bicycle Company, Chicago, Ill.**

**Filed Apr. 10, 1987, Ser. No. 36,882**
**Int. Cl.[4] A63B *21/00*; F16H *37/06, 7/00***
**U.S. Cl. 272—73** **14 Claims**

1. A cycle exerciser including:

a frame;

a seat mounted on said frame;

energy absorbing means rotatably mounted on said frame;

a substantially horizontal main drive shaft rotatably carried by said frame;

foot pedal crank arms at opposite ends of said main drive shaft;

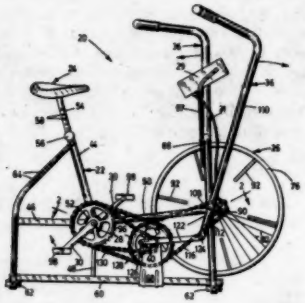
a pair of coaxial countershafts rotatably carried by said frame;

two handlebar levers mounted on said frame for oscillating movement;

first drive means comprising means connecting said main drive shaft to said energy absorbing means through one of

said countershafts to cause rotation of the energy absorbing means in response to rotation of said main drive shaft;

a pair of drive crank arms secured to opposite end portions of the other of said countershafts and extending laterally therefrom in opposite directions; and



second drive means including means connecting each of said handlebar levers to a respective one of said drive crank arms and means connecting said other countershaft to said main drive shaft to cause rotation of said main drive shaft in response to oscillating movement of said handlebar levers.

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**4,712,790**

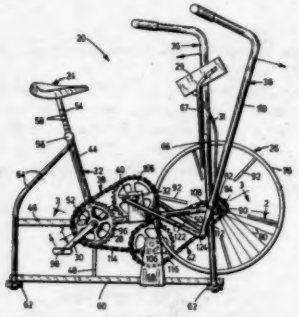
**CYCLE EXERCISER**

**Eugene J. Szymski, Skokie, Ill., assignor to Schwinn Bicycle Company, Chicago, Ill.**

**Filed Apr. 20, 1987, Ser. No. 40,341**

**Int. Cl.[4] A63B *21/00*; F16H *37/06, 7/00***

**U.S. Cl. 272—73** **6 Claims**



1. In a cycle exerciser having a frame, a pedal-actuatable main drive shaft, a pair of counter shafts, and energy-absorbing means all rotatably mounted thereon, and a pair of handle bar levers oscillatably mounted thereon, the improvement wherein

said shafts are mounted about separate, spaced, parallel, substantially horizontal axes;

a first sprocket is mounted on said main drive shaft;

a second sprocket the same size as said first sprocket is mounted on one of said counter shafts; a pair of drive crank means are secured to opposite ends of said one counter shaft and extended in opposite lateral directions;

third and fourth sprockets are mounted on the other counter shaft;

a fifth sprocket is in driving relation with said energy absorbing means;

a primary orbitally moveable endless chain is in wraparound connecting engagement with said first, second, and third sprockets; a secondary orbitally moveable endless chain is in wraparound connecting engagement with said fourth and fifth sprockets; and

said handle bar levers are connected to said drive crank arms;

whereby said energy-absorbing means may be rotatably driven by said pedals and said handle bar levers jointly or separately.

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**4,712,791**

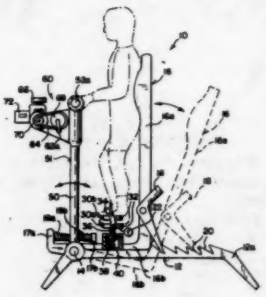
**EXERCISE MACHINE**

**Pansy S. Edwards, 16 Caraway Rd., Reisterstown, Md. 21136**

**Filed Oct. 2, 1986, Ser. No. 914,365**

**Int. Cl.[4] A63B *21/00***

**U.S. Cl. 272—73** **8 Claims**



1. An exercise machine, comprising in combination

a base,

exercise means mounted on said base for exercising at least the limbs of a user,

positionally adjustable user support means pivotally connected to said base for permitting the user to actuate said exercise means in a selected posture between upright and inclined positions, and

adjustment means for adjusting said user support means in discrete steps to a selected position within the range of said upright and inclined positions,

wherein said base is a stand, and wherein said user support means includes an L-shaped bracket having two arms, one relatively short arm and one relatively long arm, a shorter arm thereof being pivotally connected to said stand,

wherein an upwardly pointing surface of said stand is formed with a plurality of ratchet-like teeth normally pointing upwardly, and

wherein said adjustment means includes a pawl pivotally connected to a longer arm of said L-shaped bracket, and engageable with a free end thereof with one of said ratchet-like teeth on said stand.

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**4,712,792**

**GYMNASTIC AND PLAYING DEVICE**

**Wolfgang Rogall, Kirchstrasse 1, 3012 Langenhagen 4, Fed. Rep. of Germany**

**Filed May 7, 1985, Ser. No. 860,733**

**Claims priority, application Fed. Rep. of Germany, Jul. 24, 1985, 3526368**

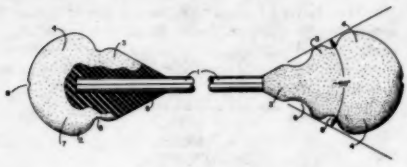
**Int. Cl.[4] A63B *15/00***

**U.S. Cl. 272—93** **10 Claims**

1. An exercise stick comprising:

two pear-like members having the same size and shape, each of the members having a tapering portion terminating in a thickened outer portion at one end and a narrow portion having a central bore therein at the other end, the outer portion of each member being ball-like and comprising elastic, deformable material in the axial direction and having a largest radial section providing a smooth surface

for adapting the exercise stick to roll on a flat surface, the tapering portion of each member having at least one circumferential groove configured to receive fingers of a hand; and



a cylindrical, flexural rod having two opposing end portions received within the narrow portion of each pear-like member to connect the members in spaced-apart relationship, the rod having an axial length substantially several times longer than the axial length of the tapered portion.

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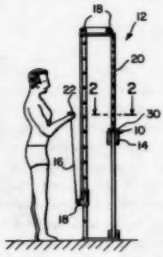
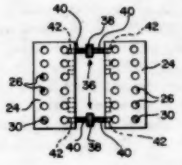
**4,712,793**
**WEIGHT MAXIMIZER**
**Milton C. Harwick, 3205 S. 3rd St., Whitehall, Pa. 18052, and George Spector, 233 Broadway, Rm. 3615, New York, N.Y. 10007**
**Filed Mar. 14, 1986, Ser. No. 839,639**
**Int. Cl.[4] A63B *21/06***
**U.S. Cl. 272—118** **6 Claims**





**1.** A weight adjustable base unit for a weight lifing device of the type having adjustable weights connected to one end of a cable, the cable trained over various pulleys on a frame and a handgrip connected to other end of the cable, said base unit comprising:

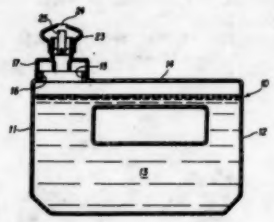
(a) a pair of base plates, each said plate having two sides and a plurality of holes therein;

(b) a clamp holding device being at least one turn bolt having two reverse threaded shafts to threadably engage within edges of said pair of base plates having holes to secure said base plates together;

(c) two-sided adhesive tape secured on one tape side to one side of each of said base plates and on said other tape side to the top of the uppermost of said ajustable weights; and

(d) a plurality of cylinder shaped weights, each being detachably inserted in said holes of said base plates so as to more preceisely adjust said weight lifting device.

**4,712,794**
**JOGGERS FLUID WEIGHTED EXERCISER JUG**
**Gary W. Hall, 7316 Carver Rd., Modesto, Calif. 95356**
**Filed Oct. 6, 1986, Ser. No. 916,014**
**Int. Cl.[4] A63B *11/00***
**U.S. Cl. 272—122** **1 Claim**



**1.** A joggers fluid weighted exerciser jug comprising a base liquid reservoir, front and rear liquid risers upstanding from and in fluid connection with said reservoir, a hollow handle connecting said front and rear liquid risers at their tops, primary cap means carried by one of said liquid risers upstanding from said hollow handle substantially normal thereto and having an upper and lower annular groove, a fluid dispensing cap having a dispensing opening and being carried by said primary cap means, spider means comprising a solid dowel upstanding therefrom carried by said primary cap means and positioned for said solid dowel to seal the dispensing opening in said fluid dispensing cap when said dispensing cap is in the down sealed position, and cap retaining means between said primary cap and said dispensing cap for locking said caps relative to one another between a sealed and dispensing condition along the axis of said dowel, said retaining means comprising an annular lip about the periphery of said dispensing cap resiliently movable between upper and lower annular grooves on said primary cap to open and close said fluid dispensing cap, said dispensing cap being shaped to fit within the mouth and behind the teeth of a user whereby said dispensing cap may be axially displaced to open and close said jug for removal of contents while jogging.

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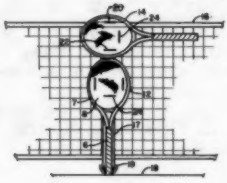
**4,712,795**
**GAME RACKET**
**An Wang, Bedford Rd., Lincoln, Mass. 01730**
**Filed May 29, 1986, Ser. No. 868,836**
**Int. Cl.[4] A63B *49/00***
**U.S. Cl. 273—73 R** **13 Claims**



**8.** A tennis racket for playing tennis, the racket comprising a head supporting strings and a handle extending from the head along a handle axis, the head having a free end located away from the handle and the handle having a free end located away from the head, the handle and head defining a racket length, the racket having at least one prominent, linear mark thereon which is parallel to or perpendicular to the handle axis and which is isolated from like marks so as not to be confused with other like marks, the mark defining, relative to an end or side edge of the racket, a measurement length which runs perpen-

dicular to the linear mark, the measurement length being equal to the difference between 36" and the racket length.

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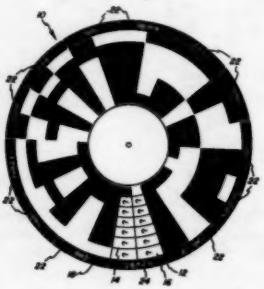
4,712,796

## DEVICE FOR OBTAINING SUBSETS FROM A FIELD OF CHARACTERS

Alan Reiss, Rexford, N.Y., assignor to World Gaming Consultants, Hingham, Mass.

Filed Feb. 18, 1986, Ser. No. 830,455
Int. Cl.[4] A63B 71/06
U.S. Cl. 273—148 R 1 Claim



1. A device for generating a plurality of subsets from a prechosen field of characters comprising:

a first circular, substantially transparent surface having a designated area for recording a field of characters, said designated area having a plurality of spaces aligned in at least two adjacent rows extending outwardly toward the perimeter of the device, said spaces closer to the periphery being larger than those spaces further from the periphery;

a second circular surface lying beneath and in registry with respect to said first surface, said surfaces being rotatable with regard to each other, said second surface having a plurality of marked segments each of which is adapted to correspond to the designated area of the first surface as the surfaces are moved, one of said segments rendering visible all the characters in the designated area, the other segments having portions which correspond to respectively different arrays of spaces of the designated area and obscure some of the characters while allowing the characters in the spaces which do not correspond to the obscuring portions to remain visible, said designated area and segments corresponding to each other such that aligning the designated area over each segment provides a visible array of distinct subsets of equal size.

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4,712,797

## GOLF PUTTER WITH SIGHTING DEVICE

John G. Kovalchek, Clearwater, Fla., assignor to Fore-Sight Golf, Inc., Clearwater, Fla.

Filed Dec. 15, 1986, Ser. No. 941,665
Int. Cl.[4] A63B 53/04, 69/36
U.S. Cl. 273—163 R 8 Claims

1. A sighting device and golf putter in combination comprising

(a) a golf putter having a flat front face and a top surface mounting ridge,

(b) a continuous length wire made of rust resistant metal or stiff plastic formed to enclose a space above a golf ball juxtaposed to the front face of the putter, and

(c) the wire further formed to present a pair of legs at right angles to the plane of the enclosed space and the legs being integral with the putter through their location in a corresponding pair of downward descending holes in the mounting ridge.

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4,712,798

## GOLF PUTTER

Mario Presto, 7514 E. Granada Rd., Scottsdale, Ariz. 85257

Filed Mar. 4, 1986, Ser. No. 835,983
Int. Cl.[4] A63B 53/16, 53/06
U.S. Cl. 273—164 10 Claims

1. A golf club for use in putting, comprising:

a polycarbonate club head member having a generally triangular shape in plane and having a top surface, a bottom surface and a plurality of side surfaces, at least one of said side surfaces further comprising a striking surface for contacting a golf ball, said bottom surface further having a pair of angled surfaces, each of said angled surfaces having a downward slope from a bottom portion of one of said side surfaces toward a central portion of said bottom surface;

adjustable weighting means for varying the weight of said golf club, firmly affixed to said club head member;

aiming means for permitting a golfer to aim said golf club at a golf ball;

a shaft firmly engaged with said club head member for allowing a golfer to swing said club member; and

means for permitting a golfer to grasp said shaft.

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4,712,799

## MULTI-SCREEN VIDEO GAMING DEVICE AND METHOD

Walter C. Fraley, Carlsbad, Calif., assignor to Edwards Manufacturing, Inc., Ontario, Calif.

Continuation of Ser. No. 655,350, Sep. 27, 1984, abandoned. This application Apr. 10, 1986, Ser. No. 851,278
Int. Cl.[4] A63F 9/22
U.S. Cl. 273—138 A 16 Claims

1. In a video slot machine displaying plural movable symbol sequences stopped by the machine to indicate the result of a gaming attempt, the improvement comprising:

a plurality of adjacently-disposed video monitors, each responsive to a respective sequence of video symbol signals for providing a corresponding movable symbol sequence in a raster-scanned format in which multi-line video frames are consecutively displayed;

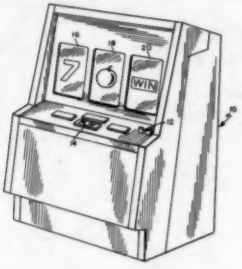
microprocessor means responsive to a gaming attempt on said video slot machine for randomly determining a plu-

rality of stopping symbols at which to stop the movements of a plurality of movable symbol sequences and, for each of said randomly determined symbols, generating a sequence of starting addresses in which the value of a starting address is incremented by a predetermined amount once each video frame to produce the next starting address of the sequence;

a plurality of reel address storage circuits, each including a counting circuit which responds to a respective sequence of starting addresses by incrementally counting from a starting address value in the sequence at a predetermined rate for the duration of at least one of the lines of a respective video frame, and a storage device containing a set of first address portions stored in a predetermined order which provides a respective first address signal sequence including a string of first address portions in response to said incremented counting;

an addressable symbol memory in which signals corresponding to a plurality of symbols are stored and which responds to said first address signal sequence and to a second address signal sequence by providing respective sequences of video symbol signals, each of said video symbol signal sequences including video symbol signals stored at symbol memory locations addressed by the combination of a respective first address sequence and said second address signal sequence; and

synchronizing and address means connected to said video monitors, said microprocessor means, and said reel address storage circuits for time-synchronizing said starting address sequences and said first address signal sequences to the raster-scanned format of said video monitors and for providing said second address signal sequence in time-synchronism with the raster-scanned format of said video display means.




10. A method for displaying a plurality of apparently-rotating symbol sequences on a set of adjacent, raster-operating video display devices included in a video slot machine having an addressable symbol memory, in which each symbol sequence is displayed in a raster-scanned format consisting of consecutively-displayed multi-line video frames on a respective one of said video display devices in response to a sequence of video symbol signals, comprising the steps of:

storing plural sets of video symbol signals in addressable storage space in said symbol memory, each of said sets corresponding to a respective video symbol;

generating a plurality of respective first address portion sequences at a first rate synchronized with the raster-scan operations of said video display devices, each of said first address portion sequences corresponding to a specific sequence of symbols;

generating a second address portion sequence at a second data rate synchronized with the raster-scan operations of said video display devices, said second address portion sequence including a succession of second address portions which, when combined with a respective first address portion sequence, produces a symbol memory address sequence that defines a predetermined succession of video symbol signals stored at correspondingly-addressed locations in said symbol memory;

combining each of said first address portion sequences with said second address portion sequence to produce a plurality of symbol memory address sequences; and

providing said plurality of symbol memory address sequences to said symbol memory to produce a plurality of corresponding video symbol signal sequences synchronized with the raster-scan operations of said video display devices.

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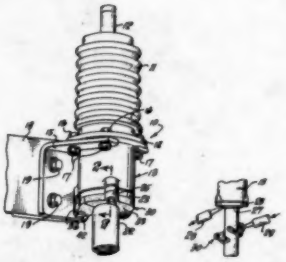
**4,712,800**

## SPLIT ELASTOMER RING FOR REPAIRING POTHEADS AND PROCESS OF REPAIRING A POTHEAD THEREWITH

**Roy E. Johnson, 12308 Aegean St., Norwalk, Calif. 90650**

**Filed Dec. 15, 1986, Ser. No. 941,322**
**Int. Cl.[4] H02G** *1/00, 15/23;* **F16J** *15/00*
**U.S. Cl. 277—1** **9 Claims**



1. A process for sealing the base of a pothead without the necessity of disconnecting the electrical cable therein, said pothead being of the type having a sealing plate on the bottom thereof surrounding the cable extending from the base of the pothead and wherein said sealing plate is held to the body of the pothead by a plurality of bolts, said method comprising the steps of:

applying a silicone sealant in and around the area where the cable enters the sealing plate;

removing all bolts which hold the sealing plate to the base of the pothead body;

twisting open an elastomeric split ring and placing said ring around the cable below the area to which the elastomeric sealant has been applied; and

moving the split ring upwardly and securing the split ring to the base of the body of the pothead.

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**4,712,801**

## SEALING GASKET ASSEMBLY

**Sigurd Kaller, Blästadgatan 111, S-582 62 Linköping, Sweden**

**PCT No. PCT/SE86/00050, § 371 Date Sep. 15, 1986, § 102(e) Date Sep. 15, 1986, PCT Pub. No. WO86/04656, PCT Pub. Date Aug. 14, 1986**
**PCT Filed Feb. 5, 1986, Ser. No. 916,512**
**Claims priority, application Sweden, Feb. 5, 1985, 8500515**
**Int. Cl.[4] F16J** *15/46, 15/56*
**U.S. Cl. 277—71** **7 Claims**

1. A sealing assembly operable between a first cylindrical component and a second cylindrical component, which first and second components are telescopically displaceable relative to each other, said gasket comprising:

an annular flange being stationary relative to one of said first and second cylindrical components, which annular flange includes a vent passage therethrough;

a first sealing ring;

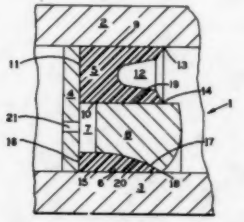
a second sealing ring separated from said first sealing ring at

a fixed distance, which first and second sealing rings cooperate to define a space therebetween;

an annular piston mounted and operable in said space, which space is vented between said annular flange and said annular piston by said annular passage vent;

one of said first and second sealing rings positioned in proximity to said first cylindrical component, said one sealing ring having a generally rectangular configuration in cross-section and defining an annular surface contacting said annular flange and an opposite surface away from said annular flange, a first and a second radially-viewed cylindrical boundary surface, and, a groove which extends toward said annular flange from said opposite surface, first and second sealing lips being formed, respectively, between said groove and said first and second cylindrical boundary surface;

the other of said first and second sealing rings having a radially-viewed cylindrical boundary surface, said other ring cylindrical boundary surface sealingly contacting



said second cylindrical component, which second cylindrical component moves relative to said sealing assembly, said other sealing ring further including an annular surface contacting said annular flange and a sloped surface extending between said annular surface contacting said annular flange and said cylindrical boundary surface and terminating in cross-section at a sharp point at said cylindrical boundary surface distal from said annular flange;

said annular piston having a generally wedge-shaped cross-section with a cylindrical boundary surface to contact at least a portion of the cylindrical boundary surface of the sealing ring in proximity to said first component adjacent a sealing lip and having a curved form boundary surface conforming to said sloped form of the sealing ring in proximity to said second component, said annular piston of a material relatively harder than said sealing rings and movable in said space toward said annular flange to maintain said first and second sealing rings in sealing contact with said first and second components.

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**4,712,802**

## SEALING WASHERS FOR HEADED FASTENERS

**George D. Hewison, Aldershot, and Terence E. Harris, Reading, both of Great Britain, assignors to Illinois Tool Works Inc., Chicago, Ill.**

**Filed Mar. 27, 1986, Ser. No. 844,790**

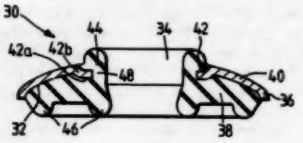
**Claims priority, application United Kingdom, Apr. 1, 1985, 8508477**

**Int. Cl.[4] F16J *15/12*; F16B *43/00***

**U.S. Cl. 277—212 C** **9 Claims**

1. A sealing washer comprising an apertured metal backing member, a sealing member of resilient material abutting one face of the backing member forming a laminate therewith, and a shoulder of resilient material abutting the opposite face of the backing member and integral with the sealing member by a connecting portion extending axially through the aperture whereby, in use, a headed fastener may be assembled to the sealing washer with a shank of the fastener extending through the aperture,

characterized in that, when considered in any plane including the axis of the aperture, the backing member includes an outer rimmed portion, an intermediate domed portion whose concave surface contacts the sealing member, and an inner depressed portion having first and second parts, the first part of the depressed portion extending more perpendicularly than the second part to the axis of the aperture for assisting in resisting tranverse spread of the



shoulder during use of the sealing washer and indicator means in the form of an outer rib is provided on that face of the sealing member for pressing against a workpiece whereby, during use of the sealing washer, the outer rib is urged outwardly to become at least equal in diameter to the rimmed portion when a correct load setting is achieved.

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**4,712,803**

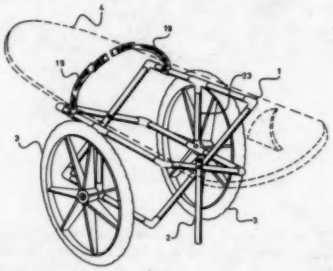
## COLLAPSIBLE SAILBOARD DOLLY

**Joseph T. Garcia, 20336 Anza Ave., #35, Torrance, Calif. 90503**

**Filed Aug. 8, 1986, Ser. No. 894,620**

**Int. Cl.[4] B62B *1/12***

**U.S. Cl. 280—47.13 B** **2 Claims**



1. A sailboard dolly comprising a frame, a stand and two wheel assemblies: said frame being collapsible in a scissors-like fashion forming a relatively flat package; said wheel assemblies being independently mounted on either side of said frame; said frame being made of light weight tubing: said frame shape, size and construction being such that a sailboard may be transported supported near its edges in a manner to minimize possible damage to the board surface, while the dolly wheelbase and length of the horizontal members provide stability and avoid tipping; said stand being for preventing the sailboard dolly from tipping on end when the dolly is stationary said frame comprising an inner frame assembly, an outer frame assembly, two telescoping support assemblies, and two pivot bolt assemblies; said telescoping support assemblies being pivotally fastened at one end to said inner frame assembly, and pivotally fastened at the other end to said outer frame assembly, so that when said frame is opened fully, said telescoping assemblies hold said inner and outer frame assemblies in a rigid frame structure capable of supporting a sailboard; said inner frame assembly and said outer frame assembly being identically shaped and sized parallelogram assemblies, except that said inner frame assembly is shorter in width so that it can rotate freely at a fixed point inside said outer frame assembly; said rotation point being determined by said two pivot bolt assemblies said bolt assemblies fastening said inner frane assembly to

said outer frame assembly; said inner and outer frame each comprising two end braces; two horizontal members each comprising two cross braces and a first and second tee section, four corner elbows and two pivot rods, said inner and outer frame assembly components being joined by gluing and a press fit; said end braces each having a hole drilled through at the center point of its length to accomodate said pivot bolt assemblies; said pivot rods having a smaller diameter than the inside diameter of said cross braces, and having two holes drilled in them to accomodate a rivet; said cross braces each having a hole drilled through them to match the position of the rivet holes in said pivot rods, which are located inside said cross braces; said stand being fastened to said frame by one of said pivot bolt assemblies, allowing said stand to be rotated when necessary; said inner and outer frame assemblies being pivotally fastened to each other by said pivot bolt assemblies and also by said telescoping support assemblies, so that said frame can open fully in an 'X' shape, or close flat in scissors-like fashion.

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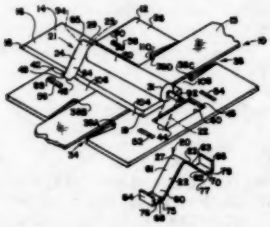
**4,712,804**

## ARTICLE CARRIER

**Eddie Harrison, Jr., 2177 N. Stocker St., Pomona, Calif. 91767**

**Filed Feb. 7, 1986, Ser. No. 827,090**
**Int. Cl.[4] B62B *3/02***
**U.S. Cl. 280—47.13 R** **11 Claims**



1. An article carrier for cooperation with a strap secured to an article to be moved comprising:

a base member having a first side and a second side;

a plate having a first end and a second end;

a first inverted V-shaped member and a second inverted V-shaped member each defining a proximal leg and distal leg extending from an apex;

said first inverted V-shaped member and said second inverted V-shaped member being spaced apart on said base member to enable said first end and said second end of said plate to engage and be slidably received between each of said proximal leg and said distal leg of said first and of said second inverted V-shaped members;

a handle with a first end and a second end;

said first end of said handle and said second end of said handle releasably secured to said apex of said first inverted V-shaped member and said apex of said second inverted V-shaped member, respectively, thereby extending between each said V-shaped member;

said plate having a first side and a second side;

said proximal leg and said distal leg of each said first and said second inverted V-shaped members being attached to said base member to enable said first end of said plate and said second end of said plate to engage and be slidably received between said proximal leg and said distal leg of each said inverted V-shaped member; and

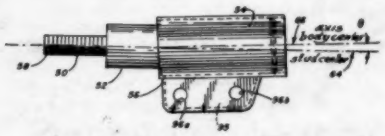
said proximal leg and said distal leg of each said inverted V-shaped member being flexible to enable said strap to pass between said first side of said base member and said second side of said plate and to enable said plate to exert pressure upon said strap and said first side of said base member upon tensioning said handle in use.

**4,712,805**

## FLEXIBLE MOUNTING FOR SPLASH/SPRAY CONTROL GUARDS AND THE LIKE

**Russell G. McMillen, c/o Suntron Corporation, P.O. Box 11426, Fort Wayne, Ind. 46858**

**Filed Mar. 13, 1986, Ser. No. 839,439**
**Int. Cl.[4] B62D *25/16***
**U.S. Cl. 280—154.5 R** **21 Claims**



1. A flexible mount for resiliently securing a first member to a second member wherein the first member can be deflected from an equilibrium position relative to the second in response for an applied force and wherein the first member returns substantially to the equilibrium position once the applied force is removed, comprising:

an elongate stud having a center axis and means disposed at one end of the stud for securing the stud to the second member; and

a body of elastomeric material encapsulating and joined to the other end of the elongate stud, the body including a body center axis disposed at an angle other than 0° with respect to the stud center axis and second means for securing the first member to the body wherein the body of elastomeric material includes a cylindrical main body portion and wherein the second securing means includes a tab extending outwardly from the cylindrical main body portion.

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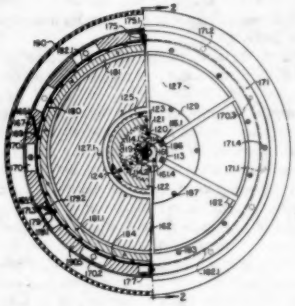
**4,712,806**

## GIROCYCLE

**Raymond A. Patrin, P.O. Box 306, Queens, N.Y. 11372**

**Filed May 28, 1986, Ser. No. 867,641**
**Int. Cl.[4] B62M *1/00***
**U.S. Cl. 280—217** **20 Claims**



1. A wheel assembly for a vehicle having an axle fixedly mounted thereon, comprising

an inner wheel rotatably mountable on the axle, said inner wheel having a surface, said inner wheel adapted to be imparted a rotational forward motion,

an outer wheel mounted centrally and concentric, peripherally around said inner wheel and rotatably relative thereto,

said outer wheel having an outermost surface adapted for riding contact with the ground and having an inner surface operatively engaging said surface of said inner wheel,

said inner surface and said surface of said inner wheel constituting operatively engaging surfaces,

the distance of said operatively engaging surfaces from said outermost surface is substantially smaller than the radius of said operatively engaging surfaces, whereby said inner wheel makes substantially relatively close contact with the ground through said outer wheel,

a flywheel-gyro mounted centrally and concentric to and rotatable by said inner wheel and rapidly rotatably relative thereto,

engaging means for selectably releasably engaging said outer wheel and said inner wheel and said flywheel-gyro for joint rotation.

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**4,712,807**

## VEHICLE ACTIVE SUSPENSION SYSTEM INCORPORATING ACCELERATION DETECTING MEANS

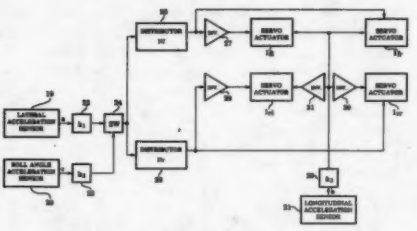
**Ryuichi Kurosawa, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed Feb. 5, 1986, Ser. No. 826,320**

**Claims priority, application Japan, Feb. 6, 1985, 60-021522; Dec. 26, 1985, 60-295943**

**Int. Cl.⁴ B60G *17/00***

**U.S. Cl. 280—707** **12 Claims**



1. A suspension system for a vehicle comprising a body and a plurality of wheels, comprising:

a plurality of actuators, each of which supports said body from one of said wheels and is controllable to provide a variable force between said body and said wheels;

a sensor means for detecting acceleration of said body in lateral directions thereof and for producing a signal representative thereof;

a sensor means for detecting roll angle acceleration of said body and for producing a signal representative thereof: and

a control means for inputting said signals representative of said lateral acceleration and said roll angle acceleration of said body from said sensor means, for calculating based thereupon fluctuations in load acting between said wheels and said body caused by said accelerations, and for controlling said actuators to increase or decrease forces provided thereby between said body and said wheels, wherein said control means comprises a means for:

(a) detecting whether or not the direction of lateral acceleration of said body as determined by said lateral acceleration detecting means is the same as or is the opposite to the direction of roll acceleration of said body as considered for a point above the center of gravity of said vehicles; and for:

(b) if said directions are the same, calculating, based upon said signal representative of said roll angle acceleration of said body from said sensor means therefor, fluctuations in load acting between said wheels and said body caused by said acceleration, and based thereupon controlling said actuators to increase or decrease forces provided thereby between said body and said wheels; and for:

(c) if said directions are opposite, calculating, based upon said signal representative of said lateral acceleration of said body from said sensor means therefor, fluctuations in load acting between said wheels and said body caused by said acceleration, and based thereupon controlling said acutators to increase or decrease forces provided thereby between said body and said wheels.

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**4,712,808**

## HOT MELT ADHESIVE COMPOSITION FOR BOOK HINGE JOINT

**Eric Beh-Forrest, Doylestown, Pa., and Thomas P. Flanagan, Green Brook, N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.**

**Filed Feb. 19, 1986, Ser. No. 831,245**

**Int. Cl.⁴ B42D *1/00***

**U.S. Cl. 281—15 R** **12 Claims**

1. A process for the formation of hinge joints on bound book blocks comprising the steps of applying a molten film of a hot melt adhesive to the outer sheet of each side of the book block on an area immediately adjacent the bound edges and for a length substantially coterminus with the bound edges; applying a cover thereto and exerting pressure on the book cover in the area of the hot melt film wherein the a hot melt adhesive is a pressure sensitive adhesive composition comprising:

(a) 20 to 35% by weight of an A-B-A-B-A-B block or multiblock copolymer where the A component is styrene and the B component is butadiene or hydrogenated butadiene; and wherein the styrene is present in an amount of at least 28 parts per 100 parts copolymer;

(b) 45 to 70% by weight of a compatible tackifying resin;

(c) 5 to 30% by weight of a plasticizing oil;

(d) 0 to 5% by weight of a petroleum derived wax; and

(e) 0.1 to 2% by weight of a stabilizer.

4. A book produced by the process of claim 1.

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**4,712,809**

## METHOD AND DEVICE FOR ASSEMBLING SEVERAL COMPONENTS, PARTICULARLY CONNECTION FITTINGS FOR FLUID COUPLINGS

**André Legris, Rennes, France, assignor to Société Anonyme Styled Legris, Rennes, France**

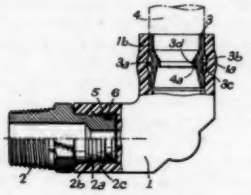
**PCT No. PCT/FR84/00108, § 371 Date Dec. 18, 1984, § 102(e) Date Dec. 18, 1984, PCT Pub. No. WO84/04069, PCT Pub. Date Oct. 25, 1984**

**PCT Filed Apr. 18, 1984, Ser. No. 694,459**

**Claims priority, application France, Apr. 18, 1983, 83 06306**

**Int. Cl.⁴ F16L *13/14***

**U.S. Cl. 285—21** **11 Claims**



1. A method of forming a stress-free, fluid tight, swivelable joint between members of different hardness for fluid coupling said members, said method comprising the steps of:

(a) force fitting the harder of said members having a projecting ridge and adjacent groove into an opening in the other of said members, thereby locally deforming and stressing a portion of said opening opposing said ridge;

(b) rotating the harder of said members at a speed sufficient to cause melting of at least some material of the locally deformed and stressed portion of said opening, whereby the melted material flows into said adjacent groove forming a fluid tight joint assembly without bonding said mem-

bers, whereby said members are operable to swivel relative to each other.

11. A stress-free assembly comprising:

a body formed from a first meltable material of a first hardness, said body having a generally cylindrical opening therein;

a generally cylindrical connecting member formed from a second material of a second hardness greater than said first hardness, said connecting member being sized to force fit into said opening;

said connecting member having an annular ridge, a first annular groove adjacent said annular ridge and a second annular groove spaced from said annular ridge, said annular ridge having a slightly larger diameter than said opening to locally deform a portion of said opening when force fit therein;

a sealing member disposed in said second annular groove;

said connecting member being shaped to receive means for rotating said connecting member relative to said body to thereby melt said locally deformed portion of said opening whereby the melted first material flows into said first annular groove, said body connecting member forming a stress-free, swivelable assembly essentially without bonding or welding said first and second materials.

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**4,712,810**

## QUICK ACTION SELF-LOCKING PIPE FITTINGS

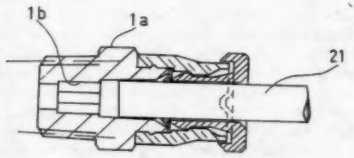
**Gian C. Pozzi, Via Concordia, 4, 21040 Menzago di Sumirago (VA), Italy**

**Filed Nov. 24, 1986, Ser. No. 933,818**

**Claims priority, application Italy, Nov. 25, 1985, 83626 A/85**

**Int. Cl.[4] F16L *35/00***

**U.S. Cl. 285—93** **9 Claims**




1. A quick action, lockable and releasable fitting for connecting a pipe or tube to a coupling body, said fitting comprising a hollow body having at least a nipple, said nipple having an internal truncated cone surface with the major base facing towards the external opening of said nipple making a leakproof seal with an end of a pipe when the latter is pushed inside said nipple, and an external cylindrical surface provided with at least a collar and terminating in a rim;

an elastic anchoring washer placed on said rim of said nipple and provided with a plurality of claws projecting radially inward from its inner circumference and long enough to be elastically flexed towards the interior of the coupling by said pipe and to abut against the external surface of said pipe preventing it from being pulled out;

a sleeve having a seat in the internal surface thereof and adapted to be forceably snapped-on said nipple until said collar on said nipple is received in said seat, the internal surface of said sleeve being further provided with a first step blocking said elastic washer against said rim of said nipple, and with a second step;

a plug having a crown and a tubular appendix terminating in a collar and having a central cylindrical hole of diameter sufficient to permit passage of said pipe through the plug, said plug by means of said appendix being forceably snapped into said sleeve by forcing said collar of said tubular appendix beyond said second step of the internal surface of said sleeve a distance such that the crown of the plug remains outside the sleeve;

cooperating means in said plug and in said sleeve for allowing or preventing an axial displacement of said plug with respect to said sleeve by rotating the plug, by means of said external crown, between at least two distinct angular position in such a way that, when in a first angular position, said plug may advance towards the interior of said sleeve until the rim of said tubular appendix flexes elastically the claws of said washer further towards the interior of the fitting parting said radially projecting claws and freeing said pipe so that it may be pulled out, and, when in a second angular position, said plug is backed out and prevented from being pushed further inside said sleeve and said claws abut against the external surface of said pipe at an angle such as to prevent withdrawal of said pipe.

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**4,712,811**

## CONNECTOR AND A METHOD OF CONNECTING PIPES

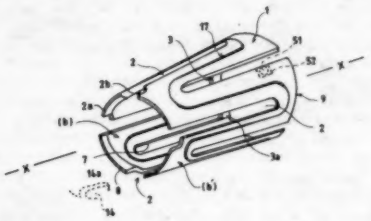
**Jan H. Wier, Burleigh, Bulls, New Zealand**

**Filed Sep. 30, 1985, Ser. No. 781,784**

**Claims priority, application New Zealand, Sep. 28, 1984, 209718**

**Int. Cl.[4] F16L *17/02***

**U.S. Cl. 285—113** **14 Claims**



1. A releasable connector comprising:

a connector body having an opening at one end;

a tapered bore extending inwardly in said connector body from said opening and increasing in diameter from said opening inwardly;

a substantially coaxial inner sleeve of plastics material positioned in said tapered bore having a substantially frustoconical shape with inner and outer ends, said outer end being nearer said opening;

an outer surface on said inner sleeve substantially complementary to said tapered bore;

a bore through said inner sleeve extending in the direction of the central axis thereof defining an inner surface having a rounded cross-sectional configuration substantially complementary to that of a connected member to be connected when inserted into said inner sleeve;

at least one substantially elongated slot through the wall of said inner sleeve extending from one of said ends of said inner sleeve and terminating short of the other of said ends so that said inner sleeve is pliable; and

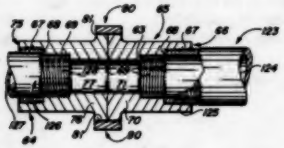
circumferentially continuous sealing means on said inner and outer surfaces of said inner sleeve, said tapered bore and outer surface on said inner sleeve having relative sizes and said inner surface on said inner sleeve having a size relative to the connected member and being adapted so that when the connected member is inserted into said bore in said inner sleeve the connected member frictionally engages said inner surface and reverse movement of the connected member in the direction opposite to said direction of insertion displaces said inner sleeve into wedging and circumferentially continuous sealing and connecting engagement with said tapered bore and into circumferentially continuous sealing and connecting engagement with the connected member for sealingly connecting the connected member in said connector body.

**4,712,812**

## UNIVERSAL FITTINGS

**Joseph W. Weir, III, 311 E. Forsythia St., Ore City, Tex. 75683**

**Filed Sep. 2, 1986, Ser. No. 902,790**
**Int. Cl.[4] F16L *25/00***
**U.S. Cl. 285—177** **2 Claims**



1. A universal union fitting for attachment to threaded and unthreaded pipes having different diameters, said universal fitting comprising a first body portion and a first central bore provided in said first body portion; at least two axial first sleeves having successively decreasing diameters provided in stepped relationship in one end of said first body portion, said first sleeves communicating with said first central bore; a first flange provided on the opposite end of said first body portion from said first sleeves and first threads provided on said first flange; a second body portion and a second central bore provided in said second body portion; at least two axial second sleeves having different diameters provided in stepped relationship in one end of said second body portion, said second sleeves communicating with said second central bore; a second flange provided on the opposite end of said second body from said second sleeves and second threads provided on said second flange; and a threaded nut disposed between said first body portion and said second body portion for engaging said first threads and said second threads and removably joining said first body portion to said second body portion.

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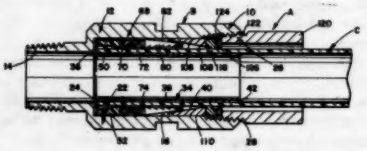
**4,712,813**

## COUPLING APPARATUS

**David P. Passerell, Geneva, and Danny G. Rogge, Dorset, both of Ohio, assignors to Perfection Corporation, Madison, Ohio**

**Filed Oct. 28, 1986, Ser. No. 924,050**
**Int. Cl.[4] F16L *33/18***
**U.S. Cl. 285—250** **15 Claims**



1. A stab-type coupling apparatus comprising:

a body having a recess defined therein, said recess having axially spaced inner and outer ends;

an elongated hollow stiffener received in said recess having an outer peripheral dimension for defining a generally annular cavity with said body, said cavity adapted to receive an associated non-metallic pipe end;

an elastomeric first seal member received in said recess adjacent said inner end and adapted for sealing engagement between said body and an associated non-metallic pipe end;

a collet retainer disposed in said recess between said first seal member and recess outer end, said collet retainer having a generally tapered outer surface and a toothed inner surface;

a ring disposed in said recess having a generally tapered inner surface in facing, conforming relation with said collet retainer outer surface adapted to cam said collet retainer inner surface toward engagement with an associated non-metallic pipe end; and,

a gasket disposed in said recess between said collet retainer and said recess outer end, said gasket adapted to be compressed toward sealing engagement with an associated non-metallic pipe end.

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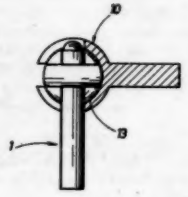
**4,712,814**

## COUPLING ARRANGEMENT

**Tom Petterson, Box 19, S-452 05 Sydkoster, Sweden**

**PCT No. PCT/SE85/00210, § 371 Date Jan. 17, 1986, § 102(e) Date Jan. 17, 1986, PCT Pub. No. WO85/05418, PCT Pub. Date Dec. 5, 1985**
**PCT Filed May 21, 1985, Ser. No. 833,386**
**Claims priority, application Sweden, May 21, 1984, 8402711**
**Int. Cl.[4] F16L *37/26***
**U.S. Cl. 285—325** **3 Claims**



1. Coupling means comprising a first element having a main portion in the form of at least one disc having an outer spherical surface forming a surface of rotation and sides connected by means of said spherical surface, a shaft extending from one of said sides, and a second element having a cavity with an inner surface forming more than one-half of a spherical surface of rotation, said cavity having a diameter slightly larger than said surface of rotation of said first element, said cavity having an opening to allow the main portion of the first element to be inserted therethrough into the cavity, said opening being in the form of a first slot, said first slot being sized to correspond to the width of the main portion of the first element measured parallel to the axis of the shaft, and a second slot being sized to correspond to the width of the shaft so that the main portion of the first element can be introduced into the cavity by inserting it through the first slot with the shaft introduced into said second slot until the center of the spherical surface of the first element coincides with the center of the spherical surface in the cavity of the second element, whereby the first and second elements can be locked to each other by turning the main portion of the first element in the cavity as the shaft moves in the second slot so that the outer spherical surface is substantially out of alignment with said first and second slots.

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**4,712,815**

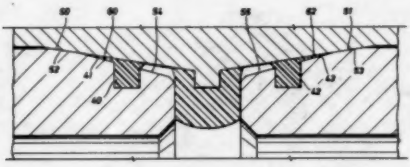
## METAL-TO-METAL WEDGE THREAD COUPLING CONNECTOR

**Doyle E. Reeves, Houston, Tex., assignor to Hydril Company, Houston, Tex.**

**Filed Oct. 2, 1984, Ser. No. 657,078**
**Int. Cl.[4] F16L *15/04***
**U.S. Cl. 285—334** **3 Claims**

1. In a threaded connection comprising a short tubular coupling having two sets of internal threads that taper inwardly from opposite ends of the coupling toward the center to mate with external threads on pin ends of two axially aligned pipes, said threads of the coupling and the pin ends being dovetailed shaped in cross-section with the axial width of the internal threads of the coupling increasing in one direction and the axial width of the external threads on the pin ends increasing in the opposite direction so that thread flanks of both external and internal threads will engage as elongated wedges to form

metal-to-metal seals when the connection is made up fully, said threads further having roots and crests that are parallel to a longitudinal axis of the coupling that engage before the flanks engage when the connection is made up hand tight and that also form metal-to-metal seals when the connection is fully made up, the improvement comprising an internal projection



integral with the coupling and located between the two sets of threads and a resilient corrosion barrier ring having an external groove to receive the projection and hold the ring on the projection and which is compressed between tip ends of the pin ends of the pipes when the connection is made up fully to protect the metal-to-metal seals from corrosive fluids in the pipes.

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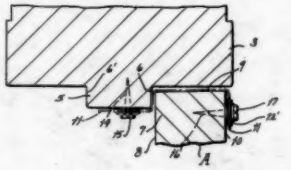
**4,712,816**

## AUXILIARY DOOR LATCH FOR CHILDREN'S SAFETY

**Theodore V. Mueller, 760 Preakness La., Florissant, Mo. 63033**

**Filed May 12, 1986, Ser. No. 861,980**
**Int. Cl.[4] E05C *19/18, 3/04***
**U.S. Cl. 292—253** **1 Claim**



1. In combination with a door and a frame therefor, said frame having first and second opposed jambs and a header defining a door opening, said opposed jambs and header having outer and inner sides, said door having an outer face, an inner face, and first and second opposed side edges, means swingably mounting said second side edge of said door to said second jamb for optional opening and closing action of said door with respect to said door opening, said door being free on the first side edge thereof and with said first side edge being presented confrontingly toward said first jamb when said door is in a closed condition, said frame further having a jamb stop provided on said first jamb, said jamb stop having a central portion projecting into said door opening and an outer and an inner shoulder, said outer shoulder being presented a distance from the outer side of said first jamb for receiving the door therebetween when closed whereby the inner face of said door approximate the free edge thereof will be in confronting relationship with the door stop outer shoulder, an auxiliary door latch for maintaining said door in closed condition for assuring security comprising a first mounting member secured upon said jamb stop between said outer and inner shoulders and having a head projecting spacedly from said jamb stop into said door opening, a second mounting member secured upon and projecting outwardly of said outer face of said door proximate the free side edge thereof, and an independent latching element detachably interengaging said first and second mounting members for securing said door against accidental opening comprising an elongated, narrow, thin, flat, tape-like, latching element being free at opposite ends thereof and fabricated of flexible, durable material said latching element conforming to the contouring developed by the outer face of said door, the free side edge of said door, the outer shoulder of the jamb stop, and the central portion of said jamb stop when the door is in closed condition, said latching element being in a non-interfering disposition between the jamb and the door free edge and the jamb stop outer shoulder and door inner face, said latching element having an opening provided adjacent, but spacedly from, each end thereof, said latching element openings being of predetermined cross section with the heads of said first and second mounting members projecting therethrough placing said latching element in an operative condition.

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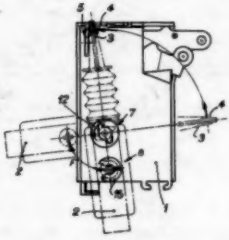
**4,712,817**

## DOOR LATCH ASSEMBLY, IN PARTICULAR FOR AN AUTOMOBILE VEHICLE

**Richard Grandjean, Saint Die, France, assignor to Compagnie Industrielle de Mecanismes en abrege C.I.M., France**

**Filed Jul. 14, 1986, Ser. No. 885,123**
**Claims priority, application France, Jul. 19, 1985, 85 11115**
**Int. Cl.[4] E05C *13/10***
**U.S. Cl. 292—336.3** **4 Claims**



1. A door latch assembly for an automobile vehicle comprising:

a latch cover having a rectangular box configuration and an upper wall having a cavity in said latch cover and said latch cover being constructed to provide a plurality of hollow boss means projecting above said upper wall and fixed to said upper wall;

a locking actuator mounted on said latch cover;

anchoring means securing said locking actuator to a corner of the upper face of said latch cover;

said locking actuator including a carriage having an elastic portion;

a crank lever including a tab located in the cavity of said latch cover adapted for pivotal movement in the corner below the upper wall of said latch cover;

a first stud integral with said locking actuator having a circular center portion and wings on each side of said center portion, said wings and circular center portion being adapted to be introduced into the opening at the top wall of said first boss;

a second stud integral with said actuator having a center portion and wings adapted to be fitted through the top wall of said second boss;

a plurality of cylindrically shaped boss means comprising a first hollow boss means secured to the upper wall of said latch cover, said first boss means having a top wall with an opening to receive said first stud and wings of said anchoring means and a second hollow boss means secured to the upper wall of said latch casing which is located below said first hollow boss means on said upper wall of said latch casing to receive a locking means;

said actuator being adapted to introduce said first stud into said first boss permitting the anchoring means to be placed in locked position and to introduce said second stud into said second boss by an angular movement of said actuator to the locking member, so that in one position the actuator can be withdrawn from said latch cover and in another

position the actuator may be retained on said latch cover whereby in the locked position the actuator is retained on said cover.

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**4,712,818**

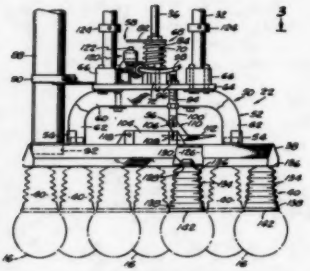
## VACUUM MANIFOLD WITH QUICK CONNECT-DISCONECT LATCH ASSEMBLY

**Bradley N. Borgman, Riverside; Jerry W. Cramer, Upland, and Don E. Dossey, Montclair, all of Calif., assignors to Sunkist Growers, Inc., Sherman Oaks, Calif.**

**Division of Ser. No. 570,265, Jan. 12, 1984, Pat. No. 4,583,910. This application Jan. 30, 1986, Ser. No. 824,245**

**Int. Cl.[4] B65B** *35/38*

**U.S. Cl. 294—64.1** **2 Claims**



1. In apparatus for picking up and transferring layers of round food articles, the apparatus including a movable carriage for positioning and shifting at least one movable pickup head, said at least one pickup head including a manifold adapted for connection with a vacuum source and an array of vacuum cups mounted on the manifold for engagement with the round food articles, the improvement comprising:

a mounting bridge connected to the carriage for said at least one pickup head,

multiple spaced apart brackets mounted on the at least one pickup head for engagement with said mounting bridge,

a vacuum conduit in communication with the vacuum source and adapted for sealed communication with an opening in the manifold, and

latch means adapted for rapid connection and disconnection between the at least one pickup head and said mounting bridge whereby said at least one pickup head is rapidly replaceable upon the carriage with the at least one pickup head being secured by said latch means in a relative position precisely determined by said brackets, said latch means including a lever pivotably connected to one of said mounting bridge and the manifold, a ramp element being angularly affixed to said lever and including a notch along its ramp surface for engagement with a pin in the other of said mounting bridge and manifold, connector means being secured to said other of the mounting bridge and manifold, said connector means comprising means arranged in spaced apart relation for alternate engagement of said pin with said ramp element whereby said latch means is adapted for securing the at least one pickup head in one of a plurality of predetermined positions relative to said mounting bridge.

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**4,712,819**

## TOOL FOR LIFTING DOORS AND PANELS

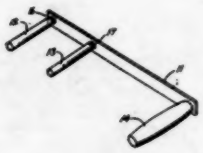
**Urban Pope, 168 E. Vista Ave., Daly City, Calif. 94014**

**Filed Jun. 7, 1982, Ser. No. 385,479**

**Int. Cl.[4] B66F** *15/00;* **B65G** *7/12*

**U.S. Cl. 294—92** **5 Claims**

1. A tool for setting a door in a jamb, comprising an elongated arm comprising a flat bar of generally rectangular cross-section positioned between one side edge of the door and the jamb and having a handle portion which projects outwardly on one side of the door, said elongated arm being of sufficiently narrow width to move freely between the door and the jamb when the door is installed in the jamb, and a pair of generally parallel fingers extending from the arm on opposite sides of the



door for gripping engagement with the door when the handle is lifted in a vertical direction, one of said fingers being threadedly attached to the bar and removable from the arm to permit withdrawal of the arm from between the door and the jamb when the door is installed.

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**4,712,820**

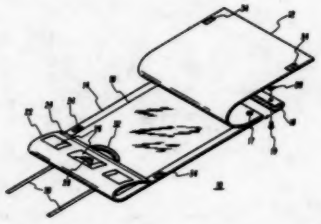
## DOCUMENT CARRIER

**Robert Cartledge, McKinney, Tex., assignor to Shepard & Associates, Dallas, Tex.**

**Filed Nov. 14, 1986, Ser. No. 930,467**

**Int. Cl.[4] G09F** *3/18*

**U.S. Cl. 294—138** **12 Claims**



1. A document carrier for storing and transporting documents such as blueprints, comprising:

a pair of flaps of durable pliable material affixed at one end between which the documents are placed, one of said flaps being longer,than the other so as to enable the free end to be placed over the documents when in an unrolled viewing state.,

at least one strap affixed to one of said flaps for binding said pair of flaps when in a rolled state, and

a strap handle affixed to one of said flaps for holding said pair of flaps when in a rolled state.

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**4,712,821**

## GRAIN BOX CLEANOUT DEVICE

**James E. Scharf, Box 305, Perdue, Saskatchewan, Canada S0K 3C0**

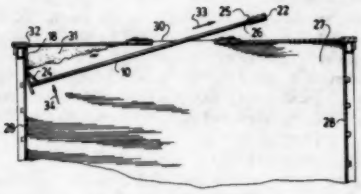
**Filed Dec. 29, 1986, Ser. No. 947,376**

**Int. Cl.[4] E01H** *5/02;* **A62C** *1/06;* **B05B** *7/02*

**U.S. Cl. 294—19.1** **14 Claims**

1. A hoe or scraper for use in cleaning out grain from the lower rear corners of a dump truck box when in the dump position, said truck box including a substantially centrally located tailgate opening in the base of said tailgate assembly; said hoe or scraper comprising an elongated handle and a scraper blade secured by one end thereof and extending transversely upon either side of said handle, said handle being secured to said blade offset from the vertical axis of said blade,

thereby defining a minor portion of said blade extending upon one side of said handle and a major portion of said blade extending upon the other side of said handle, said major portion of said blade being arcuately curved for at least part of the



length thereof whereby the distal end of of such blade is situated closer to the other end of said handle than the point of attachment of said one end of said handle to said blade, said scraper being engageable through the associated tailgate opening and into either of the rear corners of said truck box.

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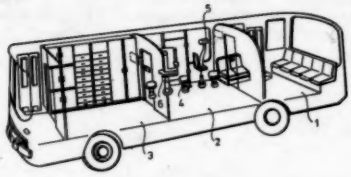
**4,712,822**

## SIGHT-TESTING AMBULANCE BUS

**Antal János, Budapest, and Pojbics Jenö, Esztergom Rozetti, both of Hungary, assignors to Latszereszeti Eszkozok Gyara, Hungary**

**Filed Apr. 30, 1986, Ser. No. 857,856**
**Claims priority, application Hungary, May 3, 1985, 1695/85**
**Int. Cl.[4] B60P *3/14***
**U.S. Cl. 296—24 R** **4 Claims**



1. Sight-testing ambulance bus, comprising an inner space including at least a sight-testing room and an optical workshop, said sight-testing room being equipped with vibration sensitive instruments required for performing ophtalmological procedures, said optical workshop being equipped with tools and control instruments required for manufacturing spectacles, at least one of said instruments which is sensitive against vibrations is mounted on a respective support plate (**11**) supported by support rods (**12**) having telescopically adjustable lengths and standing on a floor (**9**) of said bus, said floor (**9**) defining respective openings (**22**) under said rods (**12**) being releasably covered and uncovered, and in a parking position of said bus said rods (**12**) extending through said openings (**22**) and abutting the ground under said bus, and a spacing (**20,21,22**) is formed between said rods (**12**) and the openings of said spacing being larger than the amplitude of vibration of a part of the bus that takes place during use, whereby said part can not touch said rod through said spacing.

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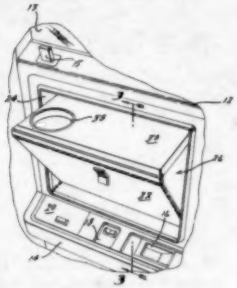
**4,712,823**

## CUP HOLDER APPARATUS

**Ronald E. Mills, Birmingham, and Peter J. Perry, South Lyon, both of Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.**

**Filed May 5, 1986, Ser. No. 859,966**
**Int. Cl.[4] B60R *7/04***
**U.S. Cl. 296—37.8** **1 Claim**

1. In combination with a vehicle body panel having an access opening, a cup holder apparatus mounted in said access opening and movable between a stowed position generally parallel with said panel and an extended position projecting outside said compartment access opening, said cup holder apparatus comprising a housing having a frame surrounding said access opening and opposite generally vertically extending side walls positioned to extend to one side of said vehicle body panel, a cover member pivotally supported on a horizontal axis adjacent a lower edge of said housing, said cover member substantially closing said access opening when the cup



holder is in stowed position, a shelf member having a first edge hingedly mounted adjacent an upper edge of said cover member, said shelf being movably supported within slots provided in said vertical walls of said cup holder housing such that said shelf is within said housing and generally parallel with said vehicle body panel when the cup holder apparatus is in the stowed position, and generally in a horizontal position projecting outwardly from said vehicle body panel in the extended position of said cup holder apparatus.

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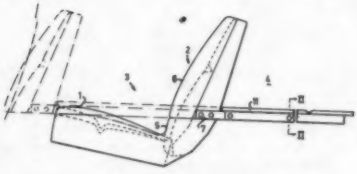
**4,712,824**

## VEHICLE BACK-SEAT

**Michel S. Naert, Vastra Frolunda, Sweden, assignor to AB Volvo, Goteborg, Sweden**

**Filed Mar. 12, 1986, Ser. No. 839,023**
**Claims priority, application Sweden, Mar. 12, 1985, 8501225**
**Int. Cl.[4] B60N *1/10***
**U.S. Cl. 296—65 R** **4 Claims**



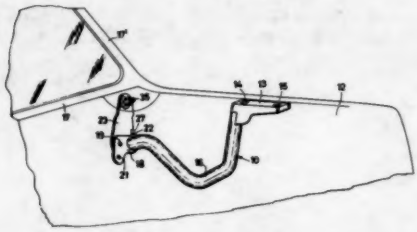
1. Back-seat in a vehicle, especially in a so-called station wagon with a cargo space behind the back-seat, comprising a seat-bottom and a seat-back, characterized in that at least an upper portion of the seat-back is mounted for horizontal displacement in an upright position relative to the seat-bottom between a rear normal upright position and a forward upright position in which the displaceable seat-back portion is situated at or in the vicinity of the forward edge of the seat-bottom.

**4,712,825**

## SUPPORT ARM FOR THE TRUCK LID AND/OR THE HOOD OF A MOTOR CAR

**Renzo Braga, Milan; Renato Pasquali, Garbagnate Milanese, and Franco Mendicino, Arese, all of Italy, assignors to Alfa Romeo Auto S.p.A., Naples, Italy**

**Filed Nov. 7, 1986, Ser. No. 928,091**
**Claims priority, application Italy, Nov. 21, 1985, 23912/85[U]**
**Int. Cl.[4] B62D *25/10***
**U.S. Cl. 296—76** **3 Claims**



1. A supporting arm for the trunk lid or the hood of a motor car, said arm having a first part fastened to the trunk lid or the hood of the motor car, said arm having a second part which hinges said arm onto the bodywork of the same motor car, said second part of said arm comprising hinge linking means for hingeably attaching said arm and secured trunk lid or hood to the motor car whereby the trunk lid or the hood may open and close relative to the motor car, and said hinge linking means having manually disengagable lock means for releasing said hinge linking means to permit the trunk lid or the hood to be spaced away and apart from the rear windshield or the windshield respectively whereby the glass may be mounted in the motor car.

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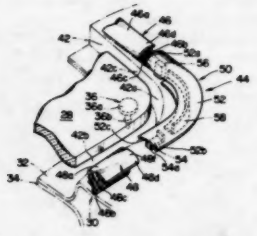
**4,712,826**

## AUTOMOTIVE WINDOW AND MOLDING ASSEMBLY HAVING A DEVICE FOR MOUNTING A CORNER JOINT

**Kiyoshi Omori, Utsunomiya, Japan, assignor to Nissan Motor Co., Ltd., Japan**

**Filed Dec. 24, 1986, Ser. No. 945,966**
**Claims priority, application Japan, Dec. 28, 1985, 60-299193**
**Int. Cl.[4] B60J *1/02***
**U.S. Cl. 296—93** **8 Claims**



1. A window and molding assembly for mounting an automotive vehicle window, comprising:

a window glass having a corner portion;

a vehicle body having a flanged opening portion for receiving said window glass in such a manner as to provide a space between said window glass and said vehicle body;

sealant-adhesive filling said space, said space having a corner portion located correspondingly to said corner portion of said window glass and a pair of elongated portions diverging from said corner portion of said space;

a window molding having a corner joint molding element having a head portion extending between said window glass and said vehicle body to cover said corner portion of said space and an anchor portion inserted into said space, said anchor portion being L-shaped in cross section so as to cooperate with said head portion to clamp therebetween said window glass;

said window molding having a pair of elongated molding elements covering said elongated portions of said space and abutting said corner joint molding element;

said flanged opening portion of said vehicle body having a corner located correspondingly to said corner portion of said window glass and being formed with a hole at said corner thereof;

a support pin having at an upper end thereof a head portion supporting said corner portion of said window glass and a leg portion fitted in said hole of said flanged opening portion; and

adhesive means for adhesively attaching said corner portion of said window glass to said head portion of said support pin.

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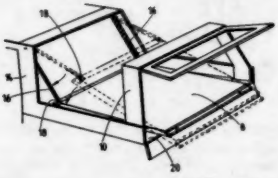
**4,712,827**

## CONVERTIBLE CAR

**Jakob Jensen, Viborg, Denmark, assignor to Logicar A/S, Viborg, Denmark**

**Continuation of Ser. No. 860,046, May 6, 1986, abandoned, Continuation of Ser. No. 711,515, Mar. 6, 1985, abandoned. This application Feb. 17, 1987, Ser. No. 15,028**
**Claims priority, application Denmark, Jul. 6, 1986, 3119/83**
**Int. Cl.[4] B60J *7/08*; B62D *33/04***
**U.S. Cl. 296—99 R** **4 Claims**



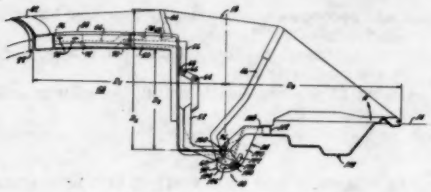
1. A convertible car having a cabin, the rear part of which is convertible into an open platform section, the rear cabin portion being provided with a roof section convertible into a carrier platform, said roof section being releasable from a supporting engagement with a foremost and a rearmost cabin frame portion for being guidable downwardly in a carrier platform position, the rearmost of said cabin frame portions thereafter being forwardly displaceable into engagement with the foremost cabin frame portion, the roof section is connected with the foremost cabin frame portion by a pair of rod means telescopically held within the roof section and pivotally secured to said foremost frame portion, each of said rod means having a pivotal joint, which is withdrawn from within the roof section by rearward retraction of the roof section upon the rear end of the roof section having been released and swung down from the rear cabin frame portion, said pivotal joints being located so as to enable, upon their being withdrawn, said rod means to be downwardly pivotable for lowering of a front end of the roof section to the carrier position during concurrent forward displacement of the roof section, while the rear of the roof section is freely lowerable into engagement with support means at the desired carrier platform height.

4,712,828

## CONVERTIBLE TOP APPARATUS FOR MIDENGINE AUTOMOBILES

**Leonard N. Albrecht, Irvine, Calif., assignor to California Auto Trends, Irvine, Calif.**

Filed Nov. 7, 1985, Ser. No. 796,074
Int. Cl.[4] B60J 7/12
U.S. Cl. 296—121 20 Claims



1. Convertible top apparatus for midengine automobiles having a forwardly extending engine compartment access opening and a forwardly extending rear deck lid for covering said opening, the convertible top apparatus comprising:

(a) a convertible top frame assemble configured for being foldable from an extended condition to a collapsed condition and unfoldable from the collapsed condition to the extended condition;

(b) a fabric convertible top covering configured for fitting over the top frame assembly when said assembly is in the extended condition;

(c) means for pivotally mounting forward regions of the rear deck lid to the automobile for pivotal movement of the deck lid between a closed condition in which the engine compartment access opening is closed and an open position in which said opening is uncovered; and

(d) lost motion connection means for mounting the top frame assembly to said means for pivotally mounting enabling concurrent pivotal motion of the deck lid and retention of the respective condition of the frame assembly.

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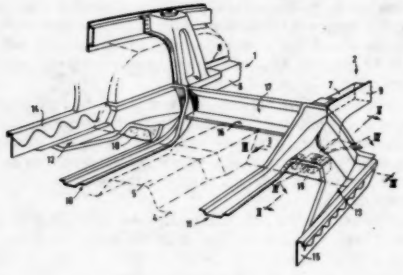
4,712,829

## SIDE MEMBER SUPPORT

**Oskar Hurten, Cologne, and Hans Vogt, Overath, both of Fed. Rep. of Germany, assignors to Ford Motor Company, Dearborn, Mich.**

Filed Apr. 4, 1986, Ser. No. 848,059
Claims priority, application Fed. Rep. of Germany, Apr. 3, 1985, 3512213
Int. Cl.[4] B62D 25/20
U.S. Cl. 296—203 2 Claims



1. Improved front side members for the front part of a self-supporting motor vehicle bodywork of the type in which the bodywork includes a floor panel having a tunnel and front side members positioned on opposite lateral sides of the tunnel and extending longitudinally of the vehicle inboard of sill members of the vehicle, each improved front side member comprising laterally inner and outer side member panels arranged together to form:

a front region in which:

the inner side member panel is formed to define a laterally outwardly opening U-shaped cross-section having vertically extending weld flanges; and

the outer side member panel is formed to define a flat cross-section abutting the adjacent inner side member panel weld flanges;

a fork region in which:

the inner side member panel is formed to reorient the weld flanges away from the vertical position abutting the outer side member panel; and

the outer side member panel is formed to extend laterally outwardly in V-shaped cross-section; and

a rear region in which:

the inner side member panel is formed to define an upwardly opening U-shaped section having horizontally extending weld flanges secured to the floor panel; and

the outer side member panel is formed to define vertically opening U-shaped cross-sections and having weld flange portions for attachment to the floor panel and the vehicle sill members; and

a reinforcing panel is secured to the outer side member panel proximate its point of attachment to the floor panel.

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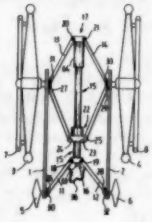
4,712,830

## FOLDING CHAIR COMPRISING QUICK UNLOCKING MEANS

**Jean-Jacques Charbrol, Gironde, and Jean-Pierre Lambert, Indre-et-Loire, both of France, assignors to Composites Aquitaine S.A. and Etablissements Poirier S.A., both of Paris, France**

Filed May 5, 1986, Ser. No. 859,580
Claims priority, application France, May 6, 1985, 85 06842
Int. Cl.[4] A61G 5/00
U.S. Cl. 297—42 4 Claims



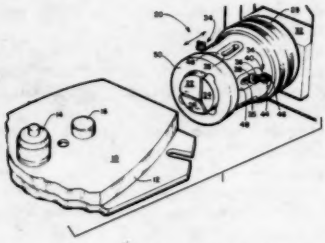
1. In a folding chair comprising means for holding the chair in the opened out position, which are foldable, means for locking said holding means in the opened out position, which comprise a hollow bar, a slide mounted for sliding on said bar and coupled to said holding means so as to prevent said holding means from folding up against when said holding means occupies an end position along the bar, and for allowing folding when said holding means leaves said end position and slides along said bar, means for locking said slide in said end position and means for unlocking said slide, said unlocking means comprise a rod, mounted in said hollow bar and longitudinally slidable therein for movement on the chair so as to be able to be brought into a position in which said unlocking means cooperates with said locking means for unlocking said slide, said means for locking said slide comprise a retractable stud carried by said slide and being projectable inside said bar through an opening disposed in line with said end position of said slide, said rod having an end arranged for pushing said stud out of said bar when said rod is moved along the bar.

4,712,831

## JAW ALIGNMENT PIN FOR A STRETCH JAW CHUCK

Everett L. Stoneman, San Diego, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

Filed Jan. 12, 1987, Ser. No. 2,246
Int. Cl.[4] B23B 31/10
U.S. Cl. 279—123 9 Claims



1. A pin assembly for maintaining a jaw portion in a predetermined position within a translatable jaw housing of a stretch jaw chuck, said jaw housing having a bore therein and said chuck housing having a plurality of spaced apart elongated openings, the elongation of the openings extending in the direction of movements of said jaw portion with the chuck housing and comprising:

a bushing with a central aperture therethrough with an inner bottom exterior surface thereon carried by each jaw portion;

a pin having a first end insertable through one of said slotted openings in said chuck housing and through said central aperture in said bushing for removable locking engagement with said bottom exterior surface of said bushing and a second end extending outwardly from said slotted opening; and

a bias means carried by said pin and located intermediate said slotted opening and said second end for maintaining pin locking engagement with the bottoom exterior surface of said bushing.

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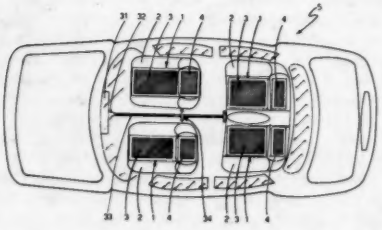
4,712,832

## COVER, PARTICULARLY FOR VEHICLE SEATS

Adriano Antolini, Via Santucci, 58; Rodolfo Morigi, Via Fiume Abbandonato, 136, and Giancarlo Saviotti, Via Savini, 31, all of 48100 Ravenna, Italy

Filed Jun. 24, 1986, Ser. No. 877,921
Claims priority, application Italy, Jun. 24, 1985, 3470 A/85; Jul. 8, 1985, 4950/85[U]
Int. Cl.[4] A47C 7/72
U.S. Cl. 297—180 12 Claims



1. A cover for seats used in vehicles or the like for channelling air at a desired temperature to an occupant's body, comprising:

(a) a first outer layer for being positioned adjacent the body of an occupant of the vehicle;

(b) a first inner layer extending substantially parallel to said outer layer;

(c) a first intermediate layer positioned between said first outer layer and said first inner layer;

(d) said intermediate layer including a plurality of interwoven members welded together and forming a substantially honeycomb-shaped structure permitting free circulation of air therethrough and sturdy support for the occupant's body;

(e) said intermediate layer including upper and lower substantially planar surfaces;

(f) means for securing said substantially planar upper surface to said outer layer; and

(g) means for securing said substantially planar lower surface to said inner layer.

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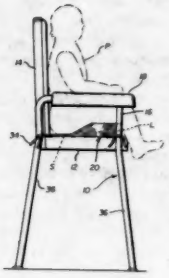
4,712,833

## SEAT CUSHION FOR PREVENTING SLOUCHING OF AN INFANT OR WEAKENED ADULT

Elrod H. Swanson, Des Plaines, Ill., assignor to Swanson Brothers, Inc., Elk Grove, Ill.

Filed Oct. 16, 1986, Ser. No. 919,369
Int. Cl.[4] A47C 31/00
U.S. Cl. 297—219 14 Claims



1. For use with a chair having a seat with spaced forward and rearward edges, an improved cushion adapted to be removably secured to the chair so as to cover most of the seat, said cushion comprising the combination of

a padded member having a bottom and a top, and having front, rear and opposed side edges extended therebetween;

the bottom of said padded member being generally flat; and the top of said padded member having generally flat forward and rearward portions meeting between the front and rear edges, and being angled relative to one another;

the angled rearward top portion of the padded member further being angled relative to the bottom of the padded member, to define a wedge configuration pointing rearwardly toward, and having an apex at, the rear edge thereof;

said padded member between the said front and rear edges being only slightly smaller than the chair seat between the said forward and rearward edges, and being sufficiently wide between the two side edges to extend beyond and underlie the legs and/or seat area of the person who will sit on the chair seat;

means to removably hold the padded member on and secured relative to a chair seat: with the wedge configuration pointing rearwardly toward, but being only slightly spaced forwardly of, the rearward edge of the chair seat; and with the front edge located even with or only slightly rearwardly of the forward edge of the chair seat;

so that a person may sit on the chair seat: with his/her seat area disposed closely adjacent the rearward edge of the chair seat, to be seated erect, and with his/her seat area disposed just rearwardly of and/or on the wedge configu-

ration of the padded member; and with the forward portion of his/her seat area and part of his/her legs between the knees and seat area crossing over the rearward and forward top portions of the cushion; and

the padded member having a firmness to withstand the weight of the person who will normally sit on the cushion and yet deform, but not to a dimension less than between approximately 10% and 40% that of the original dimension.

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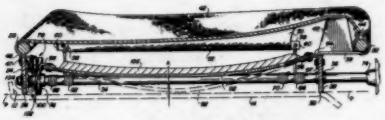
**4,712,834**

## ADJUSTABLE SEAT CUSHION WITH TENSION LIMITING MEANS

**James C. Warrick, Tempe, Ariz., assignor to Simula, Inc., Phoenix, Ariz.**

**Filed Dec. 18, 1986, Ser. No. 943,169**
**Int. Cl.[4] A47C *7/14*; B64D *11/06, 25/04***
**U.S. Cl. 297—284** **20 Claims**



1. A bottom cushion for use in a seat of the type used when rapid vertical acceleration or deceleration could occur, said seat having a rigid seat pan, said seat cushion comprising:

(a) a frame defining an opening;

(b) subframe means below said frame and defining a plane below said frame which is coextensive with the seat pan of the seat when said bottom cushion is used therein;

(c) a flexible membrane mounted in said frame to span the opening thereof and having a preloaded tension so that it will be deflected downwardly toward the plane of said subframe when an occupant sits on said bottom cushion;

(d) adjustable tensioning means mounted in said subframe and connected to said membrane, said tensioning means having a latched state wherein it is operable for adjustably increasing the tension on said membrane to vertically and upwardly displace said membrane relative to the plane of said subframe and having a released state wherein any tension applied to said membrane by said tensioning means is removed; and

(e) vertical displacement limiting means mounted in said subframe and interacting with said membrane and said tensioning means for placing said tensioning means in its latched state when said membrane is below a predetermined distance above the plane of said subframe and for placing said tensioning means in its release state when said membrane is above said predetermined distance.

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**4,712,835**

## CHAIR WITH SEAL SPRING MECHANISM

**Rolf Völkle, Siemensstrasse 2, D-7298 Lossburg, Fed. Rep. of Germany**

**PCT No. PCT DE/00325, § 371 Date Sep. 12, 1986, § 102(e) Date Sep. 12, 1986, PCT Pub. No. WO86/03954 PCT Pub. Date Jul. 17, 1986**
**PCT filed Sep. 12, 1986, Ser. No. 919,263**
**Claims priority, application Fed. Rep. of Germany, Jan. 12, 1985, 3500932**
**Int. Cl.[4] A47C *3/00***
**U.S. Cl. 297—304** **18 Claims**

1. A chair, especially for children and teenagers, comprising

a seat having a knee-support area;

a plurality of substantially horizontal legs extending radially from a vertical axis, said horizontal legs being provided with casters for resting said chair on a floor;

a supporting frame secured to said horizontal legs, said supporting frame comprising

a horizontally extending portion disposed close to said floor at a distance therefrom determined by the heights of said horizontal legs and said casters; and

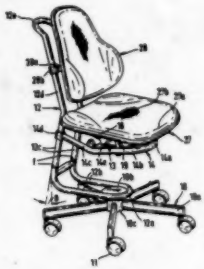
a vertically extending portion having an adjustment section, the angle between the horizontally and vertically extending portions of said supporting frame being not greater than about 90°;

a back-rest attached to the vertically extending portion of said supporting frame;

a substantially horizontal support arm adjustably mounted on said supporting frame at the adjustment section thereof and extending toward the knee-support area of said seat, the height of said support arm above said horizontal legs being adjustable;

a horizontal shaft pivotably mounted on said support arm and extending in the direction transverse to the direction in which said support arm extends, said horizontal shaft being located near the knee-support area of said seat and having a radial arm;

a tiltable seat support member attached to said seat and to said horizontal shaft, said seat support member being



rotatable about said shaft through a predetermined swivel angle;

a spring mechanism including a single helical tension spring, disposed substantially horizontally along a tension axis, having one end attached to the radial arm of said horizontal shaft and the other end to said support arm, said spring mechanism suppressing the tilting of said seat support member when said swivel angle is decreased and stimulating the tilting of said seat support member when said swivel angle is increased;

detent means for limiting the magnitude of said swivel angle; and

means for prestressing said helical tension spring, said means being adjustable as a function of the weight on said seat, whereby said swivel angle is limited to a predetermined middle range within the range determined by said detent means.

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**4,712,836**

## LEG REST FOR BELOW KNEE AMPUTEE

**James R. Gerber, 1171 Ringling Ave., Johnstown, Pa. 15902**

**Filed Oct. 21, 1985, Ser. No. 789,662**
**Int. Cl.[4] A47C *7/52***
**U.S. Cl. 297—429** **4 Claims**

1. An adjustable stump rest for attachment to a wheel chair suitable, when attached to said wheel chair, for use by below-the-knee amputees, said stump rest comprising, in combination:

a stump rest panel;

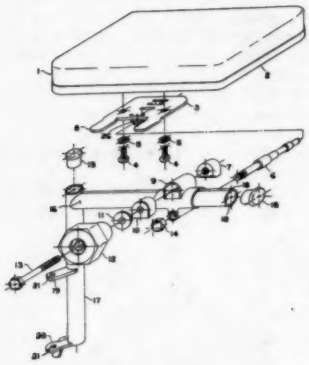
a vertical tube having situated thereon means for securing said tube to said wheel chair;

a horizontal tube permanently attached to said vertical tube at or near the top thereof, said horizontal tube having at least one longitudinal ridge extending substantially the length thereof and one longitudinal ridge extending substantially the upper length thereof;

a cylindrical sleeve slideably mounted on said horizontal tube, said sleeve having a transverse channel at the top thereof, said channel communicating with said horizontal tube, said channel adapted to receive and retain locking

means, said locking means when engaged with said tube and said upper ridge securing said sleeve to said horizontal tube;

said locking means comprising a knobbed clasp bolt, flanged clasp and opposing threaded flanged clamp, said clamps



mounted on said bolt and said clamps situated on a horizontal plane on opposing sides of said horizontal tube and said upper ridge; and

said sleeve further having attachment means situated thereon for securing said sleeve to said stump rest panel.

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**4,712,837**

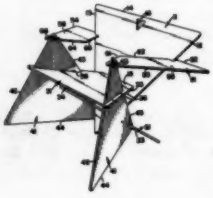
## CHAIR WITH INTERLOCKING MULTIPLE COMPONENTS

**Dennis N. Swilley, #12 W. Oak Bluff, Aubrey, Tex. 76227**

**Filed Oct. 9, 1986, Ser. No. 916,870**

**Int. Cl.[4] A47C *4/00***

**U.S. Cl. 297—442** **26 Claims**



1. A chair capable of being assembled for use and disassembled for portability and storage, comprising:

first and second leg members;

a seat member interlockably connected to and between the leg members;

a back member removably and interlockably connected to the seat member;

an arm member comprising right and left-hand arm portions joined by an interconnecting section, the interconnecting section being removable and interlockably connected to the back member, and the right and left-hand arm portions being removably and interlockably connected to the first and second leg members, respectively;

and a seat support member disposed beneath the seat member, the seat support member being removably and interlockably connected to and between the leg members, and removably and interlockably connected to the back member, and the seat support member having a portion that engageably supports the underside of the seat member.

**4,712,838**

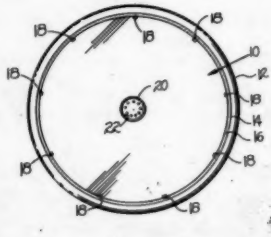
## DEMOUNTABLE DISC COVERS FOR SPOKED WHEELS

**Roger M. Berg, Beaverton, and Francis H. Scott, Washington County, both of Oreg., assignors to UNI-BMX, Inc., Aloha, Oreg.**

**Continuation of Ser. No. 811,503, Dec. 19, 1985, abandoned. This application Feb. 19, 1987, Ser. No. 18,796**

**Int. Cl.[4] B60B *7/04, 7/06***

**U.S. Cl. 301—37 SA** **4 Claims**



1. A demountable disc cover for a bicycle wheel having a rim, an axle, and a multiplicity of spokes interconnected therebetween, consisting essentially of:

a. hoop means of substantially the circumference of said rim but fitting inside thereof, said hoop means being of relatively stiff springy material and having circumferential adjustment means therein;

b. cover means of flexible material removably fitting over said hoop means and having:

1. an axial opening therein to receive said axle; and

2. a circumferential casing thereon;

c. a loop of stretch cord of less length than said circumference threaded in said casing;

d. a multiplicity of fastening means:

1. removably affixed to said spokes; and

2. removably holding said hoop means adjacent said rim.

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**4,712,839**

## VEHICLE BRAKING SYSTEM

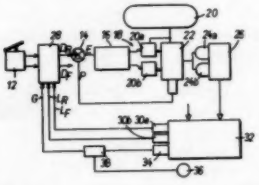
**Malcolm Brearley, Solihull, and Richard B. Moseley, Birmingham, both of England, assignors to Lucas Industries public limited company, Birmingham, England**

**Filed May 30, 1986, Ser. No. 868,559**

**Claims priority, application United Kingdom, May 30, 1985, 8513686**

**Int. Cl.[4] B60T *13/66, 13/74***

**U.S. Cl. 303—3** **11 Claims**



1. An electronically controlled braking system for a vehicle comprising:

(a) means for generating driver's braking demand signals for the vehicle brakes;

(b) means for generating electrical signals dependent upon dynamic vehicle load;

(c) means enabling the braking demand signals to be modified, individually for each axle of the vehicle, in dependence upon vehicle load measurements;

(d) means for sensing predetermined conditions of vehicle speed, braking level and vehicle operating gradient;

(e) means for generating a signal proportional to vehicle deceleration;

(f) means for generating a deceleration error signal by comparison of the driver's braking demand signal and measured actual deceleration; and

(g) means for generating an adaptive factor from said deceleration error signal and using same, under said predetermined conditions of vehicle speed, braking level and operating gradient, and over a number of vehicle stops, to correct the braking demand signals in order to compensate for long term deterioration of the brakes and to restore expected braking performance.

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**4,712,840**

**DECELERATION-RESPONSIVE BRAKING CORRECTOR**

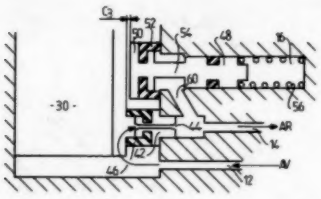
**Jean-Jacques Carre, Le Raincy, France, assignor to Bendix France, Paris, France**

**Filed Jun. 9, 1986, Ser. No. 871,749**

**Claims priority, application France, Jun. 20, 1985, 85 09368**

**Int. Cl.[4] B60T *8/28***

**U.S. Cl. 303—24 R** **9 Claims**




1. A deceleration-responsive braking corrector for a brake system of a vehicle, comprising a body having a chamber, an inlet connected to the chamber and intended to be connected to a pressurized fluid source, an outlet connected to the chamber and intended to be connected to brakes of the vehicle, characterized in that the corrector comprises a mass which is mounted slidably inside the chamber and movable in response to deceleration of the vehicle, a pressure responsive piston engaging and pushing the mass toward a rest position and forming a closure element for a shut-off valve of a nonrestricted first passage connecting the chamber with the outlet, and a by-pass second passage connecting the chamber with the outlet and having a restriction which bypasses the shut-off valve and which can be sealed off and closed by the mass when the mass moves in response to deceleration, so that closure of the shut-off valve and nonrestricted first passage is effected initially by means of the pressure responsive piston being displaced by pressure and sealing off closure of the restriction occurring sequentially thereafter and effected by the mass.

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**4,712,841**

**FAIL SAFE CIRCUIT FOR AN ANTI-LOCK BRAKING SYSTEM MODULATOR DRIVE**

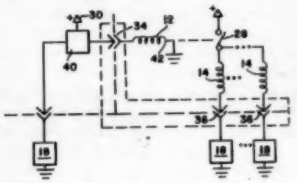
**Jerry L. Cage, Granger, Ind., assignor to Allied Corporation, Morristown, N.J.**

**Filed Nov. 19, 1986, Ser. No. 932,120**

**Int. Cl.[4] B60T *8/88***

**U.S. Cl. 303—92** **7 Claims**

1. In an anti-lock braking system which includes sensor means coupled to the wheels of a vehicle to generate signals corresponding to the rotational behavior of said wheels, an electronic control unit connected to said sensor means to receive said signals and generate a plurality of control signals of first predetermined polarity in response to an incipient wheel lock condition, an electrical connecting means, at least one solenoid operated modulating valve connected to said electronic control unit through said connecting means for operation in response to predetermined ones of said control signals, a relay connected to said electronic control unit through said connecting means and operative in response to a predetermined one of said control signals to connect said modulating valve to a source of operating potential, the improvement comprising a relay driver circuit connected between said electronic control unit and said connector means, said relay driver circuit generating a relay control signal in response to said



predetermined one of said control signals and of a polarity opposite said first predetermined polarity, one of said relay and said solenoids being electrically disabled in response to a short circuit between said connecting means and a source of said first polarity, the other of said relay and said solenoids being electrically disabled by a short circuit between the said connecting means and a source of said opposite polarity.

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**4,712,842**

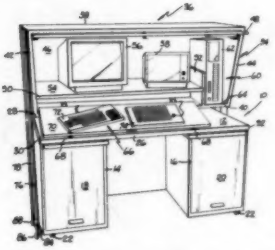
**MOVABLE COMPUTER WORK PROCESSING SYSTEM**

**Macy J. Price, Golden; Mack E. Johnson, Littleton, and Norman J. Acker, Denver, all of Colo., assignors to Engineered Data Products, Inc., Broomfield, Colo.**

**Filed Nov. 7, 1986, Ser. No. 928,751**

**Int. Cl.[4] A47B *21/03***

**U.S. Cl. 312—196** **14 Claims**



1. A computer work processing system comprising:

a generally flat top panel means for providing support means for work product material, said panel means having a front edge portion, a back edge portion and left and right side edge portions;

a pair of laterally spaced pedestal means for supporting said top panel means a distance above a fixed generally horizontal supporting surface area;

a movable computer work station unit having a plurality of support surfaces for supporting various components of a computer work processing system;

said support surfaces located in a housing having a bottom wall portion, a top wall portion, a back wall portion, two side wall portions and a front wall portion;

support means for supporting said bottom wall portion of said movable computer work station unit at a distance above said top panel means when said movable computer work station unit is moved to a position over a portion of said top panel means including said back edge portion;

said support means comprising a pair of spaced apart support members having upwardly extending support sections secured thereto;

each of said support sections having an upper portion secured to one of said side wall portions of said housing and a middle portion having at least a portion thereof opposite to either said left or right side edge portions;

said at least portions being spaced apart a distance greater than the distance between said left and right side edge portions;

roller means on each of said support members for permitting movement of said movable computer work station unit over said top panel means to said position over a portion of said top panel means including said back edge portion;

a slidable shelf means mounted in said housing for permitting movement of said slidable shelf means between a closed storage position in said housing and an open position with a portion thereof supported on said top panel;

pivot means connecting said slidable shelf means to said housing for permitting pivotal movement of said slidable shelf means toward said top panel means and into contact therewith when said slidable shelf means has been pulled out of said housing to said open work position;

said pivot means cooperating with a portion of said top panel means to hold said slidable shelf means at a fixed location when in said open work position and at a slight angular relationship to said top panel means so as to maintain componenents of said computer work processing system placed thereon at a relatively fixed position; and

a surface portion on said slidable shelf means for supporting various components of said computer work processing system.

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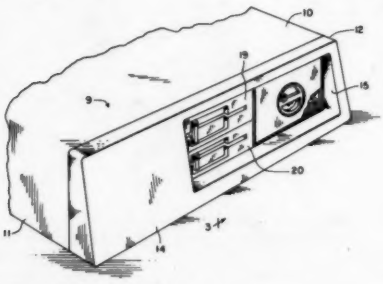
**4,712,843**
**STORAGE BOX FOR PERSONAL COMPUTER INTERIOR**

**Joseph Q. Castelli, 1563 Glencrest Dr., San Jose, Calif. 95118, and Don L. Johnson, 19467 Dorchester Dr., Saratoga, Calif. 95070**

**Filed Jul. 14, 1986, Ser. No. 885,604**
**Int. Cl.[4] A47B *63/00*; B65D *85/57***
**U.S. Cl. 312—242** **2 Claims**




1. The combination of:

A computer having a cabinet including a compartment opening to the outside and enclosing a side panel for attachment of a disk recording device; and

a box sized to fit within said compartment and having a bottom and top wall, two side walls and one end wall thereby leaving one end open for access to said box interior;

means to fix said box to said cabinet side panel in a position with said open end facing outward from said cabinet and all the other walls fitting within the cabinet in place of said disk recording device; and

a cover for fitting over said box open end with means for attachment to said box thereby to form a closed storage compartment in said computer cabinet in place of a disk recording device.

2. The method of providing storage in a computer cabinet having an empty compartment normally housing a disk drive held in by screws passing through a panel internal to the cabinet, said method comprising:

providing a box structure formed of four side walls and one end wall and having the approximate outside dimensions of the disk drive with one end open for access to the box structure interior;

inserting the box structure into said empty compartment with the open end facing outward of said cabinet;

fastening said box structure in said cabinet by passing screws through said panel and into said box structure; and

closing the open end of said box structure with a planar closure having means for attachment to said box structure wherein said means for attachment includes forming openings in two or more of said box structure walls and attaching movable planar tongues to said planar closure in position to enter said openings and hold the closure in the open end of the box structure.

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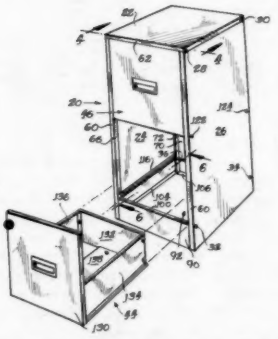
**4,712,844**
**HOME FILING CABINET**

**John A. Fry, Lindenhurst, Ill., assignor to Quaker Industries, Inc., Antioch, Ill.**

**Filed Jun. 25, 1986, Ser. No. 878,295**
**Int. Cl.[4] A47B *43/00***
**U.S. Cl. 312—265** **20 Claims**

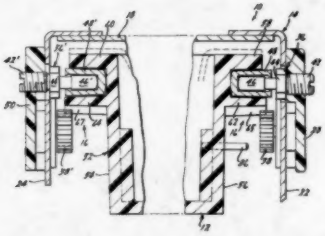


1. An easily-assembled knock-down home filing cabinet comprising: a generally rectangular top panel; a pair of generally rectangular opposite side panels engaged at respective upper margins of said top panel in a parallel and spaced apart condition; and a plurality of elongate tie rod means spanning and joining said side panels intermediate areas thereof located generally adjacent respective corners thereof for maintaining the side panels in said parallel and spaced apart condition so as to define, with said top panel, a generally rectilinear cabinet for receiving at least one file drawer; each of said tie rod means comprising an elongate rod-like member having at least one threaded end; and a complementary mating theaded fastener for threaded engagement with each said rod threaded end and for engagement with an adjacent side panel; wherein each of said elongate rod-like members is threaded at both ends thereof and further including fastener-receiving means at each of the areas adjacent said four corners of said cabinet for receiving and engaging the respective mating fasteners; wherein said rod-like member opposite ends are both externally threaded, and wherein each of said mating fasteners comprises an elongate, tubular internally threaded portion for complementary engagement with one of said threaded rod ends and an enlarged head potion; said fastener-receiving means comprising aligned through apertures in said side panels for respectively receiving said tubular fastener portions therethrough with said fastener head portions engaging exterior surfaces of said cabinet about said through apertures.

## 4,712,845
## SELF-OPENING RECEPTACLE ASSEMBLY WITH ADJUSTABLE ROLLERS

**Steven M. Nicol, Canton, Mich., assignor to NI Industries, Inc., Novi, Mich.**

**Filed Jan. 27, 1986, Ser. No. 823,033**
**Int. Cl.[4] A47B *88/16***
**U.S. Cl. 312—319** **4 Claims**



1. A self-opening receptacle assembly comprising:
a housing adapted to be supportingly secured in a motor vehicle and having an opening at one end thereof;
a container assembly movably supported for movement inwardly and outwardly with respect to said housing through said opening, said container assembly including a closure member positionable in overlying relationship to said opening when said container assembly is in a closed position;
means defining a pair of elongated arcuately shaped guide channels provided on opposite lateral sides of one of said housing and said container assembly and projecting into the space between said container assembly and said housing, said channels including first and second spaced substantially parallel surfaces and an inner end wall extending between said first and second surfaces;
a plurality of axially adjustable elongated rollers positioned in an arcuate spaced relationship on each of the opposite lateral sides of the other of said housing and said container assembly;
said rollers being received within said arcuate guide channels and cooperating therewith to provide the sole support for and to guide inward and outward arcuate movement of said container assembly with respect to said housing, each of said rollers being axially adjustable to enable accurate alignment of said closure member with respect to said housing and to assure free and easy movement of said container assembly inwardly and outwardly of said housing and including a generally cylindrical surface engageable with one of said first and second surfaces and an end surface engageable with said end wall at a substantially point contact;
biasing means operative to urge arcuate movement of said container assembly outwardly with respect to said housing; and
releasable latch means for retaining said container assembly in said closed position.

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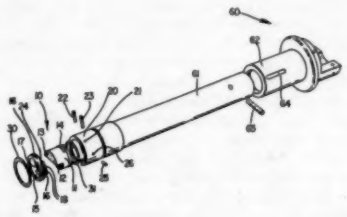
## 4,712,846
## CONNECTOR APPARATUS

**Frank B. Bardsley, Andover, and Alec B. Sycha, Wokingham, both of United Kingdom, assignors to Gearhart Tesel Limited, Basin Gstoke, England**

**Filed Sep. 12, 1985, Ser. No. 775,740**
**Claims priority, application United Kingdom, Sep. 14, 1984, 8423300**
**Int. Cl.[4] H01R *13/518***
**U.S. Cl. 439—33** **14 Claims**

1. A connector for making electrical connection between electrical conductors in a first connector casing and electrical conductors in a second connector casing, the first and second connector casings being mutually engageable in one orientation only by relative axial movement, which connector comprises a first connector assembly located in the first connector casing and a second connector assembly located in the second connector casing, the first and second connector assemblies comprising respectively first and second connector bodies matable one with another by relative axial movement in a single rotational orientation only, first and second rigid support means engaging the first and second connector assemblies respectively, each of said rigid support means including a ring



surrounding the respective connector assembly wherein each of said connector assemblies includes at least one outwardly extending engagement portion and each ring includes part-cylindrical flange means for engaging said at least one engagement portion of the respective body to prevent relative rotation between the associated connector assembly and the rigid support means, and means locating the first and second rigid support means in the first and second connector casings respectively to prevent relative axial and rotational movement therebetween, the arrangement being such that the locating means make no direct engagement with the connector assemblies.

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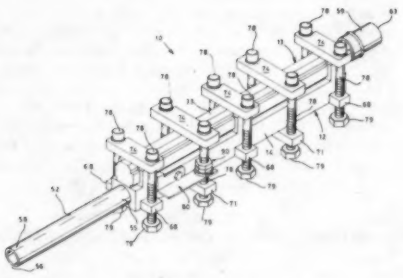
## 4,712,847
## ELECTRICAL CONNECTOR

**Brook L. Hunter, Knoxville; Joseph W. Rizzie, Knox County, both of Tenn., and Marvin L. Ward, Warminster, Pa., assignors to Technology for Energy Corporation, Knoxville, Tenn.**

**Filed May 7, 1986, Ser. No. 860,455**
**Int. Cl.[4] H01R *13/621, 13/635***
**U.S. Cl. 439—155** **16 Claims**



1. An improved electrical connector for releasably connecting a first plurality of electrical wires with a second plurality of electrical wires, which comprises:
a first connector half having
a. a first elongated housing having two end walls, two oppositely disposed side walls, and a bottom wall to define a first elongated wire cavity for receiving said first plurality of electrical wires, said first cavity defining a first elongated opening, said first housing having an aperture in one

of said end walls for routing said first plurality of electrical wires into said first cavity,

b. a first plurality of lug members extending outwardly from one of said side walls of said first housing, and a second plurality of lug members extending outwardly from the other of said side walls oppositely disposed from said first plurality of lug members, each of said lug members provided with a threaded receptor,

c. a pin insulator, defining inner and outer surfaces, mounted in said first opening whereby at least a selected portion of said inner surface of said pin insulator is accessible from said first cavity, and

d. a plurality of connector pins mounted through said pin insulator in a selected pattern whereby ends of said first plurality of electrical wires can be secured to ends of said pins within said first cavity;

a second connector half having

a. a second elongated housing having two end walls, two oppositely disposed side walls, and a bottom wall to define a second elongated wire cavity for receiving said second plurality of electrical wires, said second cavity defining a second elongated opening, said second housing having an aperture in one of said end walls, oppositely disposed from said aperture in said first housing, for routing said second plurality of electrical wires into said second cavity,

b. a socket insulator, defining inner and outer surfaces, mounted in said second opening whereby at least a selected portion of said inner surface of said socket insulator is accessible from said second cavity, and

c. a plurality of connector sockets mounted through said socket insulator in a pattern complementary of said selected pattern of said connector pins whereby ends of said second plurality of electrical wires can be secured to ends of said connector sockets within said second cavity;

a gasket member for being secured between said first connector housing and said second connector housing; and

locking means for releasably locking together said first and second connector halves with said connector pins being received in said connector sockets, said locking means having

a. a plurality of swing away clamp members equal in number to lug members of said first plurality of lug members, each of said clamp members provided with a hole therethrough proximate one end thereof and with an edge slot proximate a second end, said clamp members for engagement with said bottom wall of said second elongated housing,

b. a first plurality of bolt members each received through one of said holes in said clamp members and threadably received in said threaded receptors of said first plurality of lug members, and a second plurality of bolt members threadably received in said threaded receptors of said second plurality of lug members, each of said second plurality of bolt members releasably receiving in one of said slots of said clamp members whereby threading said first and second plurality of bolts into said threaded receptors of said lug members causes said first and second connector halves to be drawn together for engagement of said connector pins with said connector sockets and compression of said gasket between said connector halves.

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**4,712,848**

## EDGE BOARD CONNECTOR WITH POSITIVE BOARD LOCK

**Richard Edgley, Elmhurst, Ill., assignor to Molex Incorporated, Lisle, Ill.**

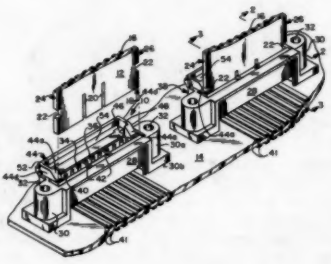
**Filed Apr. 17, 1986, Ser. No. 853,314**
**Int. Cl.[4] H01R *9/09***
**U.S. Cl. 439—327** **3 Claims**

1. A connector for electrically connecting circuits on mother and daughter printed circuit boards, said connector including an elongate dielectric housing with a cavity formed along its length with an opening for receiving said daughter board mating edge and defining opposed front and rear walls in said housing, a plurality of terminals mounted in the housing, each terminal having one end adapted to engage a daughter board circuit and another end adapted to contact a mother board circuit, means on the housing for mounting the connector to said mother board, and latch means formed on the housing for releasably securing said daughter board to said connector,

the improvement comprising:

said daughter board including a plurality of latch-receiving cut-outs disposed near said mating edge;

said integral latch means being a latch assmebly including a corresponding plurality of resilient vertical arm members spacedly disposed within the cavity, each vertical arm member hingeably connected to said rear wall having a



forwardly extending latch tab adapted to be received within a cut-out of the daughter board and a manipulable actuator opposite the tab, said actuators being mechanically interconnected by a integrally formed bail bar, said bail bar being disposed outside of the housing in parallel spaced relation to said rear wall to define a tool receiving gap therebetween, said latch assembly being moveable between a normal closed vertical position wherein said tabs are received within said cut outs and a release position wherein said tabs are retracted from said cut-outs,

whereby said latch assembly is actuable by rearward movement of said bail bar from a closed position to a release position to permit insertion or withdrawl of said mating edge into the cavity through said opening.

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**4,712,849**

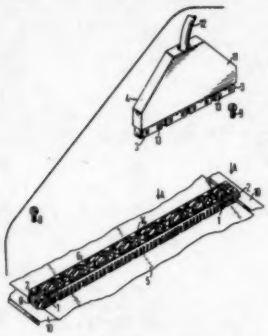
## DEVICE CONNECTING THE SHIELDING OF PLUGS TO A SUBRACK GROUND

**Peter Seidel, Groebenzell; Leo Pelzl, Holzkirchen, and Karl Zell, Niederpoecking, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Jun. 16, 1986, Ser. No. 874,862**
**Claims priority, application Fed. Rep. of Germany, Jul. 10, 1985, 3524670**
**Int. Cl.[4] H01R *13/648***
**U.S. Cl. 439—607** **10 Claims**

1. A mechanism for connecting the shielding of a plug of a multi-pole plug connector to the grounded potential layer of a subrack, whereby the plug partially immerses into a plurality of individual passages of a centering strip during the plugging operation, comprising: a metallic, electrically conductive layer being applied to the lateral faces of said passages; said shielding of the multi-pole plug being provided with a plurality of spring elements which resiliently press against said metallic layer of the lateral faces in the plugged condition of the plug said spring

elements being received in recesses in the lateral faces of said passages; and means electrically connecting the metallic layer



of the individual passages to one another and to the grounded potential layer of the subrack.

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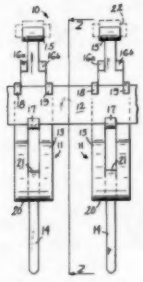
4,712,850

## TERMINAL STRIP WITH ATTACHED SUPPORT AND METHOD OF MANUFACTURE

Jack Seidler, Flushing, N.Y., assignor to North American Specialties Corp., Flushing, N.Y.

Filed Jan. 4, 1982, Ser. No. 336,924
Int. Cl.[4] H01R *11/22*
U.S. Cl. 439—861 4 Claims



1. A terminal strip comprising:

a plurality of edge clips having upper and lower ends adapted respectively for attachment to contact pads on a circuit-bearing board, and to another circuit component each of said clips having been formed in a stamping process and having a body portion;

upper and lower bendable tabs stamped from said body portion and projecting laterally therefrom; and

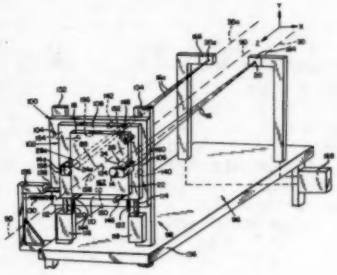
an elongate support bar of non-conductive material and of a uniform cross-section along its length, the support bar being crimped to said clips by said tabs during the stamping process, and serving to support the clips in predetermined position for subsequent attachment to circuit components.

4,712,851

## POSITIONING ALIGNMENT APPARATUS AND METHOD USING HOLOGRAPHIC OPTICAL ELEMENTS

Richard L. Fusek, Pleasanton, and Lawrence H. Lin, Alamo, both of Calif., assignors to Insystems, Inc., San Jose, Calif.

Filed Mar. 3, 1986, Ser. No. 835,779
Int. Cl.[4] G03H *1/04*
U.S. Cl. 350—3.6 18 Claims



1. A method of aligning a subject in a space coordinate system, comprising:

supporting the subject in a first position in the system, the first position being specified by translation and rotation coordinates;

providing on the subject at least one holographic optical element to develop first and second beams of light with respective first and second predetermined focal configurations;

using first and second position detecting means to determine the positions in the system of the first and second focal configurations;

recording first and second alignment information that correspond to the positions of the respective first and second focal configurations;

changing the position of the subject from the first position;

reconstructing the first and second beams of light by illuminating the number of holographic optical elements provided on the subject;

repositioning the subject so that the information indicated by the first and second position detecting means correspond to the respective first and second alignment information recorded for the subject in the first position, thereby to align the subject to the first position or a predetermined position corresponding to the first position.

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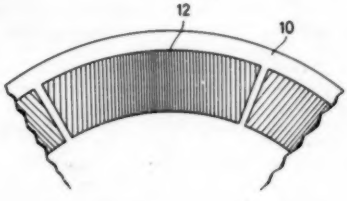
4,712,852

## HOLOGRAM DISK FOR DEFLECTING A LIGHT BEAM

Hiroyoshi Funato, and Nobuo Banba, both of Kanagawa, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jun. 3, 1986, Ser. No. 870,079
Claims priority, application Japan, Jun. 7, 1985, 60-123937
Int. Cl.[4] G02B *26/10*; G03H *1/04*
U.S. Cl. 350—371 1 Claim




1. A hologram disk for deflecting a light beam in a hologram

scanner, comprising a plurality of straight-line gratings formed by holograms in an annular pattern for deflecting the light beam, the line-to-line distance $d\theta$ between adjacent lines of each of said straight-line gratings being determined to meet, at least approximately, the following equation when said each straight-line grating is rotated through an angle $\theta R$:

$$d\theta = \frac{\lambda \sin \theta R}{\sin(\alpha \cdot \theta R)}$$

where $\lambda$ is the wavelength of the light beam and $\alpha$ is a proportionality constant, so that the angle $\theta s$ through which the light beam is deflected can be expressed by $\theta s = \alpha \theta R$.

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**4,712,853**

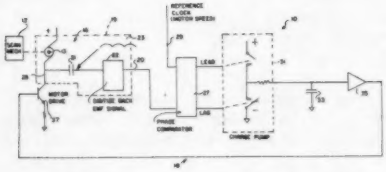
**RAPIDLY STARTING LOW POWER SCAN MECHANISM**

**P. Guy Howard, Junction City, Oreg., assignor to Spectra-Physics, Inc., San Jose, Calif.**

**Filed Feb. 27, 1986, Ser. No. 834,190**

**Int. Cl.[4] G02B *26/10***

**U.S. Cl. 350—6.5** **5 Claims**



**1.** An optical beam scanning device capable of quickly obtaining operating speed and drawing relatively low power, comprising,

optical scanning apparatus including at least one mirror for scanning a beam in a desired scanning pattern, the beam originating from a beam source associated with the scanning device,

an electric DC brush type motor driving the optical scanning apparatus,

means for picking up a back EMF signal from the motor,

processor means for comparing the back EMF signal with a reference frequency timing signal to determine whether the motor's speed is equal to the desired operating speed as defined by the reference frequency timing signal and, when the motor is not at desired speed, for generating an error signal representative of the difference between the motor's actual speed and the desired speed, and

motor speed drive means for varying power to the motor when it is not at desired speed, in accordance with the direction and size of the error signal.

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**4,712,854**

**OPTICAL WAVEGUIDE AND METHOD OF MAKING THE SAME**

**Kazuo Mikami, Kyoto; Tsukasa Yamashita, Nara, and Mitsutaka Katoh, Kyoto, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan**

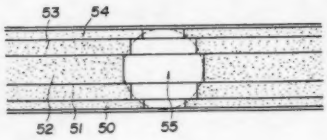
**Filed Jul. 10, 1984, Ser. No. 629,442**

**Claims priority, application Japan, Jul. 11, 1983, 58-126547; Jul. 12, 1983, 58-127489**

**Int. Cl.[4] G02B *6/10***

**U.S. Cl. 350—96.12** **6 Claims**

**1.** An optical waveguide, comprising a material having (i) a reflective index which may be varied over an extent of the material according to a degree of photopolymerization to which the material is subjected and (ii) a selective photopolymerization over said extent of the material to create a refractive index of said material which has a substantially parabolic profile in both widthwise and depthwise directions across a cross-section of said material.

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**4,712,855**

**PLANAR OPTICAL WAVEGUIDE AND METHOD OF MANUFACTURING SAME**

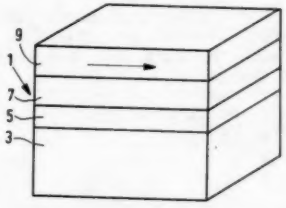
**Wolfgang F. M. Tolksdorf, Tornesch; Inske E. H. Bartels, Pinneberg; Hans O. B. Dammann, Tangstedt; Claus-Peter Klages, and Elke B. Pross, both of Hamburg, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Jan. 13, 1986, Ser. No. 818,152**

**Claims priority, application Fed. Rep. of Germany, Apr. 20, 1985, 3514413**

**Int. Cl.[4] G02B *6/10***

**U.S. Cl. 350—96.12** **20 Claims**




**1.** A planar optical waveguide having a crystal body consisting of a nonmagnetic substrate having a first magnetooptical layer epitaxially provided on the substrate and a second magnetooptical layer epitaxially provided on the first magnetooptical layer, the two magnetooptical layers consisting of a material based on iron garnet, the second magnetooptical layer having a refractive index $n_2$ which is approximately $1 \times 10^{-3}$ to $1 \times 10^{-2}$ higher than the refractive index $n_1$ of the first magnetooptical layer; characterized in that a layer (5) of a material based on iron garnet and absorbing radiation in the wavelength of $1.0 \leqq \lambda \leqq 2.5$ $\mu$m is provided between the substrate (3) and the first magnetooptical layer (7), said iron garnet-based layer having a refractive index $n_4$ which is higher than the refractive index of the first magnetooptical layer.

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**4,712,856**

**GEODESIC OPTICAL COMPONENT**

**Antonius J. A. Nicia, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.**

**Continuation of Ser. No. 628,075, Jul. 5, 1984. This application Jan. 27, 1987, Ser. No. 9,084**

**Claims priority, application Netherlands, Jul. 11, 1983, 8302461**

**Int. Cl.[4] G02B *6/10***

**U.S. Cl. 350—96.12** **10 Claims**

**1.** A geodesic optical waveguide comprising:

a substrate having a plane surface portion and a curved surface portion bounded by the plane surface portion; and

an optical waveguide layer on the surface of the substrate,

said waveguide layer having a substantially uniform thickness and following the shape of the substrate;

characterized in that:

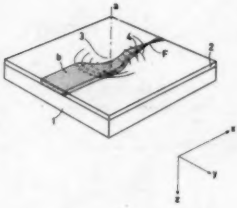
the curved surface portion is made up of a plurality of points, each point being located at a height relative to the plane surface portion of the substrate;

the curved surface portion has at least two points of local minimum height, not arranged on the boundary of the curved surface portion; and

the curved surface portion has at least one point of local maximum height arranged between the points of local minimum height.

6. A geodesic optical waveguide comprising:

a substrate having a plane surface portion and a curved surface portion bounded by the plane surface portion; and



an optical waveguide layer on the surface of the substrate, said waveguide layer having a substantially uniform thickness and following the shape of the substrate;

characterized in that:

the curved surface portion is made up of a plurality of points, each point being located at a height relative to the plane surface portion of the substrate;

the curved surface portion has at least two points of local maximum height, not arranged on the boundary of the curved surface portion; and

the curved surface portion has at least one point of local minimum height arranged between the points of local maximum height.

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**4,712,857**

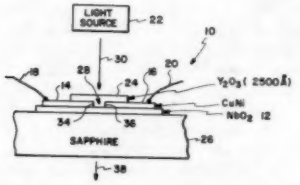
**$NO_2$ THIN FILM ELECTRO-OPTIC SWITCH**

**James C. Lee, Plymouth, Minn., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Mar. 28, 1985, Ser. No. 717,261**

**Int. Cl.[4] G02B *6/10***

**U.S. Cl. 350—96.14** **4 Claims**




1. An electro-optic device, comprising:

a niobium dioxide ($NbO_2$) crystalline material;

means for illuminating at least a portion of said crystalline material with electromagnetic energy, wherein said electromagnetic energy includes wavelengths which are at least partially transmitted through said crystalline material, and wherein said electromagnetic energy enters said crystalline material at a first location and exits said crystalline material at a second location;

means for applying an electric field to said crystalline material, wherein the direction of said electric field is coextensive with at least a portion of the path of said electromagnetic energy between said first and second locations; and

means for varying said electric field, so that the intensity of said electromagnetic energy at said second location will be a function of said electric field.

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**4,712,858**

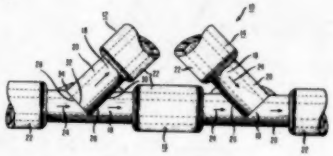
**LIGHTGUIDE ACCESS PORT**

**Herman M. Presby, Highland Park, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Labratories, Murray Hill, N.J.**

**Filed May 13, 1985, Ser. No. 733,245**

**Int. Cl.[4] G02B *6/26, 6/42***

**U.S. Cl. 350—96.15** **9 Claims**



1. An optical fiber access port structure, comprising:

a first optical fiber having a core region and a cladding region and having a first notch extending through its cladding region and partially into its core region, the notch defining two notch faces at an angle to each other;

a second optical fiber having a core region, a cladding region and at least one end face, the end face being positioned against one of the notch faces for optical coupling thereto, and longitudinal axes of said first and second optical fibers intersect at a substantially acute angle.

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**4,712,859**

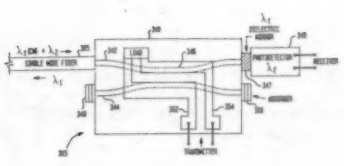
**DISTRIBUTED STAR NETWORK**

**Andres Albanese, Morristown, and Steven S. Cheng, Bernards Township, Somerset County, both of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.**

**Filed Sep. 19, 1985, Ser. No. 777,953**

**Int. Cl.[4] G02B *6/28;* H04B *9/00***

**U.S. Cl. 350—96.16** **13 Claims**



1. A telecommunications network for providing communications among a plurality of user stations comprising:

continuous wave laser means for transmitting unmodulated coherent optical radiation to each of said user stations, said means for transmitting comprising at least one single mode optical fiber link to each of said user stations,

means at each of said user stations capable of modulating information onto said radiation, and

a hub element for receiving said radiation from all of said user stations and for optically broadcasting information received from any of said user stations by means of said radiation to all of said user stations, said hub element comprising a passive optical combiner for combining said radiation received from all of said user stations and a passive optical power divider for transmitting a fraction of

the combined radiation formed by said combiner to all of said user stations.

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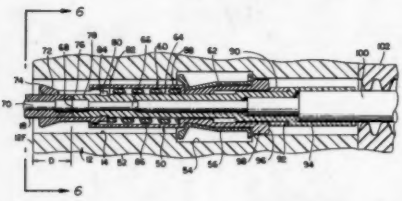
**4,712,860**

## RETROFITTABLE OPTIC FIBER CONTACT ASSEMBLY

**Patrick G. Corrales, Whittier, Calif., assignor to ITT Corporation, New York, N.Y.**

**Filed Jul. 15, 1985, Ser. No. 755,246**
**Int. Cl.[4] G02B 6/36, 7/26**
**U.S. Cl. 350—96.20** **5 Claims**



1. An optic fiber contact assembly adapted to be installed in a connector housing that has contact holes each capable of instead holding an electrical contact, comprising:

an outer sleeve with forward and rearward ends, said sleeve having a contact retaining-clip engaging portion and a forward-facing spring abutting surface;

an optic fiber tube slidable within said outer sleeve, said tube having a forward end lying near the forward end of the outer sleeve, said tube having a rearwardly-facing shoulder, thereon and a forwardly facing shoulder spaced rearward of said rearwardly-facing shoulder;

a coil spring surrounding said tube, said spring having a rearward end which lies adjacent to said spring-abutting surface of said outer sleeve, and said spring having a forward end which lies adjacent to said rearwardly-facing shoulder on said tube; and

a spring pre-loading clip which lies about said tube and abuts said forwardly-facing shoulder of said tube and the rearward end of said outer sleeve, said pre-loading clip having a sufficient length to push said tube rearwardly relative to said outer sleeve far enough to compress said spring along its length.

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**4,712,861**

## TWO-CHANNEL HERMAPHRODITIC FIBER CONNECTOR

**Helmut H. Lukas, Carleton Place, and Grant K. Pacey, Stittsville, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada**

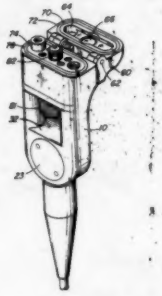
**Filed Feb. 7, 1985, Ser. No. 699,278**
**Int. Cl.[4] G02B 6/38**
**U.S. Cl. 350—96.21** **24 Claims**

1. A hermaphroditic connector, for optical fibers and the like, comprising:

a body having an end face adapted for mating hermaphroditically with a corresponding end face of another such connector; and

an end cap having an end face formed for mating hermaphroditically with said end face of said body;

said end cap being hingedly attached to said body adjacent its end face and pivotal between a closed position, in which the end face of the end cap mates with the end face of the body, and an open position in which the end face of said end cap is substantially coplanar with the end face of said body, the arrangement being such that when two such connectors are connected end-to-end with their respective end caps in said coplanar position, the respective body end faces mate hermaphroditically and the two end caps mate hermaphroditically.



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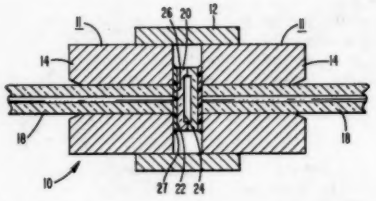
**4,712,862**

## OPTICAL FIBER CONNECTOR AND METHOD OF ASSEMBLING SAME

**Alexander W. Lightstone, Quebec, Canada, assignor to RCA Corporation, Toronto, Canada**

**Filed Aug. 27, 1986, Ser. No. 901,036**
**Int. Cl.[4] G02B 6/38**
**U.S. Cl. 350—96.21** **11 Claims**



1. A fiber optic connector for transmitting at least one wavelength comprising:

first means having a first opening for supporting a first fiber extending therethrough;

a first pellicle which is at least partially transparent at the transmitting wavelength and having first and second major surfaces wherein said first major surface extends over the first opening of said first supporting means and is attached to said first supporting means and said first fiber;

a low reflectivity coating on said second major surface of said first pellicle;

a second means having a second opening for supporting a second fiber extending therethrough;

a second pellicle which is at least partially transparent at the transmittng wavelength and having first and second major surfaces wherein its first major surface extends over the second opening of said second supporting means and is attached to said second supporting means and said second fiber;

a low reflectivity coating on said second major surface of said second pellicle; and

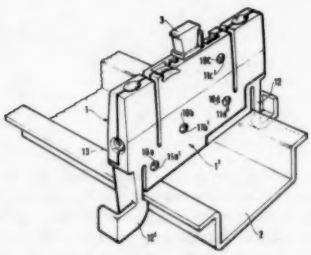
removable sleeve means connecting and aligning said first and second supporting means in spaced apart relation with a predetermined air gap between the second major surfaces of the first and second pellicles.

4,712,863

## JUNCTION BLOCK FOR OPTICAL FIBERS

**Jean-Paul Heng, Lyons; Marcel Jusseau, Villeurbanne, and Alain Humbert-Labeaumaz, Bron, all of France, assignors to Cgee Alsthom, Levallois-Perret, France**

**Filed Jun. 12, 1986, Ser. No. 873,551**
**Claims priority, application France, Jun. 12, 1985, 85 08902**
**Int. Cl.[4] G02B *6/38***
**U.S. Cl. 350—96.21** **8 Claims**



1. A junction block for end-to-end interconnection of two optical fibers each having a core and a coating about said core, said block comprising two identical parts having identical faces assembled flush face-to-face, and forming a block having a fiber-receiving duct passing therethrough, said parts each including a half duct running along a corresponding one of said parts within said face thereof, said duct having a mid guide portion and two retaining members suitable for receiving two fibers inserted into respective ends thereof, and for positioning the cores of said two fibers in end-to-end alignment inside said mid guide portion thereof, and for holding said fibers in place by clamping their respective coatings inside two retaining members of the duct, said two retaining members being located adjacent to respective ends of said mid guide portion and each retaining member being constituted by two resiliently separable, half retaining members allowing momentary lateral separation after face-to-face assembly of said block parts at the plane of the face-to-face assembly of said parts to enable a fiber to be connected to pass therethrough in order to properly position the core of said fiber for interconnection with the core of the other fiber.

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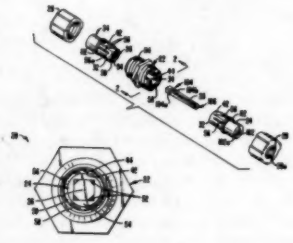
4,712,864

## MULTI-CHANNEL FIBER OPTIC CONNECTOR

**Roger H. Ellis, Atherton, and John W. Alyea, San Carlos, both of Calif., assignors to Luxtron Corporation, Menlo Park, Calif.**

**Filed May 2, 1985, Ser. No. 730,669**
**Int. Cl.[4] G02B *6/40***
**U.S. Cl. 350—96.22** **17 Claims**



1. A connector for connecting a first and a second group of optical fibers in axial alignemnt, comprising:

receptacle means having therein a bore, the surface of said bore at one end of the bore defining a first surface, and the surface of said bore at the other end defining a third surface, each of said first and third surfaces comprising a curved portion and only one substantially flat reference surface portion;

first plug means having a mating portion shaped to fit into the end of the bore of the receptacle means having the first surface, the outside surface of the mating portion of the plug means defining a second surface, said second surface comprising a curved surface portion of a shape substantially similar to that of the curved portion of the first surface and only one substantially flat reference portion shaped to contact the reference portion of the first surface when the mating portion of the plug means is inserted into the bore, said first plug means adapted for connectic n with a first group of one or more optical fibers so that the ends of the fibers in the first group are substantially fixed in position relative to the reference portion of the second surface, one of the curved portions of the first and second surfaces having one or more bosses thereon for contacting the other curved portion, wherein one boss is located so that when the mating portion is inserted into the bore, the two reference portions will contact and be urged against each other to connect the first group of fibers to the receptacle means so that the fibers are in selected positions relative to the reference portion of the first surface; and

a second plug means having a mating portion shaped to fit into the other end of the bore, the outside surface of the mating portion of the second plug means defining a fourth surface which includes a flat portion shaped to contact the flat portion of the third surface, said second plug emans adapted for connection with the second group of one or more optical fibers so that the ends of the fibers in the second group are substantially fixed in position relative to the flat portion of the fourth surface, one of the third and fourth surfaces having one or more bosses thereon for contacting the other of the third and fourth surfaces wherein one of the bosses on the third or fourth surface is located so that when the second plug means is inserted into the other end of the bore, the flat portions of the third and fourth surfaces will contact and be urged against each other to connect the second plug means to the receptacle means, the relative orientations of the flat portions of the first and third surfaces of the bore being such that each of the ends of one or more fibers in the first group is aligned with an end of a fiber in the second group;

whereby the connector permits the two groups of fibers to be repeatedly disconnected and then re-connected while maintaining substantially the alignment of the fibers when re-connected.

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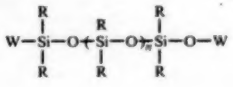
4,712,865

## DYE CONTAINING SILICON POLYMER COMPOSITION

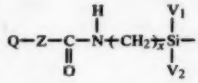
**Li-chien Hsu, Mission Viejo, and Hal Heitzmann, Irvine, both of Calif., assignors to Baxter Travenol Laboratories, Deerfield, Ill.**

**Filed Jan. 5, 1987, Ser. No. 529**
**Int. Cl.[4] C07F *7/08, 7/10, 7/12***
**U.S. Cl. 350—96.29** **5 Claims**

1. A dye containing solid gas permeable silicone composition comprising a polysiloxane polymer structure and a polynuclear aromatic hydrocarbon/silane photoactive center substituent chemically attached to the polymer structure, wherein the dye containing polysiloxane polymer is a linear siloxane having the formula



wherein n is an integer of from 1 to 10,000; R is independently selected from hydrogen, hydroxyl and halogen or alkyl, aryl, alkenyl, acyloxy and alkoxy groups of up to 30 carbon atoms or the silane photactive center substituent, W having the following formula:



(III)

where Q is a polynuclear aromatic hydrocarbon based fluorescent dye; x is an integer of from 1 to 10; Z is a hydrocarbon of up to 50 carbon atoms and V, and V2 are independently any hydrocarbon of up to 50 carbon atoms or hydrogen, halogen, aryl, hydroxyl, alkoxy, acyloxy or alkenyl substituent.

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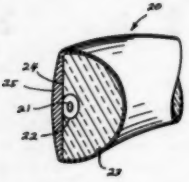
**4,712,866**

## INDIUM-CLAD FIBER-OPTIC POLARIZER

**Richard B. Dyott, Orland Park, Ill., assignor to Andrew Corporation, Orland Park, Ill.**

**Filed Jul. 24, 1986, Ser. No. 888,930**
**Int. Cl.[4] G02B** *6/16*
**U.S. Cl. 350—96.30** **5 Claims**



1. A fiber-optic polarizer comprising the combination of
an optical fiber having a polarization-holding core and cladding with different refractive indices and forming a single-mode guiding region,
said guiding region being offset from the center of gravity of the fiber section and located sufficiently close to the surface of one side of the fiber, along a selected length of the fiber, to expose the evanescent field of the guiding region at the surface of said one side to allow coupling to a contiguous medium,
the outer surface of the fiber having a non-circular cross-section with a predetermined geometric relationship to said guiding region and a pair of orthogonal polarization axes therein so that the location of said guiding region and the orientation of said axes can be ascertained from the geometry of said outer surface, and
a coating of indium on at least said one side of the fiber where said evanescent field is exposed so that light waves having undesired polarizations are attenuated by said indium coating.

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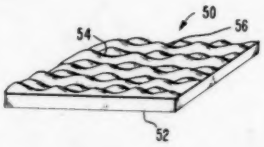
**4,712,867**

## RETROREFLECTOR

**Fritz J. Malek, Santa Barbara, Calif., assignor to Santa Barbara Research Center, Goleta, Calif.**

**Continuation of Ser. No. 473,479, Mar. 9, 1983, abandoned. This application Jan. 7, 1986, Ser. No. 817,765**
**Int. Cl.[4] G02B** *5/128*
**U.S. Cl. 350—103** **3 Claims**

1. A retroreflector for reflecting radiation over a wide range of incident angles, said retroreflector comprising:
a nonreflective base having a back surface and a forward surface, said forward surface comprising a series of adjacent wavy columns having alternately disposed hills and valleys running longitudinally on said base, each column having rounded top faces extending in all directions as well as rounded lower portions, laterally adjacent columns being offset such that the valleys of a given column are bounded laterally by hills of adjacent columns;
adjacent faces in different columns blending smoothly into each other and being arranged so that lines normal to said adjacent faces define angles of less than 90 degrees with respect to each other, with lines normal to all faces in the forward surface defining an angle of less than 45 degrees with respect to a line normal to the back surface; and
a substantially uniform coating of retroreflective elements in the form of glass spheres suspended in a polymeric material secured substantially throughout and covering the entirety of the forward surface of the base whereby incident radiation up to 90 degrees from said normal to the back surface can be retroreflected.



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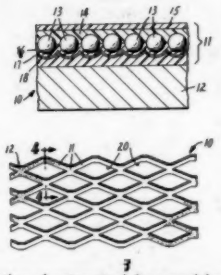
**4,712,868**

## EXPANDED RETROREFLECTIVE SHEET MATERIAL

**Chi F. Tung, Mahtomedi, and James C. Coderre, White Bear Lake, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Sep. 23, 1985, Ser. No. 778,806**
**Int. Cl.[4] G02B** *5/128, 5/124, 17/00*
**U.S. Cl. 350—105** **5 Claims**

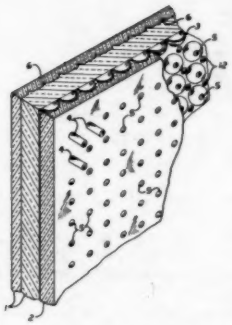


1. Retroreflective sheet material comprising retroreflective sheeting laminated to a base sheet, the retroreflective sheeting being selected from (1) sheeting that comprises a monolayer of transparent microspheres and a layer of specularly reflective material underlying the microspheres and 2) sheeting that comprises cube-corner retroreflective elements; the laminated sheet assembly being slit in an array of spaced discontinuous slits; and the laminated sheet assembly being expanded so that openings occur at the slits, and portions of the laminated sheet assembly between the slits bend out of the plane they originally occupied.

## 4,712,869
## THREE DIMENSIONAL STACKED REPRODUCTION SCREEN

Claxton John C., 10844 High Ridge Rd., Jacksonville, Fla. 32225

Filed Oct. 24, 1986, Ser. No. 922,888
Int. Cl.[4] G03B 21/60
U.S. Cl. 350—126 2 Claims



1. Stacked multiple transparent screen device as a means for displaying light from each separate optic fiber or other light source over a specific area of a specific screen and viewing said light through intervening subsequent screens when intervening areas of subsequent screens are unlit, said stacked multiple transparent screen device comprising:

a. stacked multiple transparent screens as a means whereby lit areas become opaque to "through the screen" viewing while lit,

b. mirrored layer sandwiched between screen layers as a means to reflect light from light source or fiber optic fiber back to viewer while unlit area of mirrored surface passes light freely from rear allowing through the screen viewing,

c. reflecting devices imbedded in screens as a means to reflect light from fiber optic fiber or other light source back on mirrored surface,

d. between the screens air gaps or vacuum gaps whereby with next transparent layer or screen that light enters it effects a masking screen to mask or hide the dot or unlit area of mirror by refraction of the converging light from outer edges of lighted area or mirrored surface.

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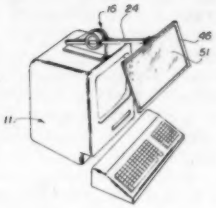
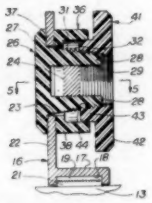
## 4,712,870
## FRESNELL LENS AND FILTER FOR USE WITH COMPUTERS AND THE LIKE

Donald L. Robinson, and William Ojala, both of 660 El Camino, Millbrae, Calif. 94030

Filed Apr. 3, 1986, Ser. No. 847,733
Int. Cl.[4] H04N 5/72
U.S. Cl. 350—243 12 Claims

1. An auxiliary device for a viewing screen housed in a cabinet, comprising a bracket having a first base and an upward projecting member formed with an aperture, first attachment means adapted to attach said first base to the cabinet, an elongated bar, a Fresnell lens, second attachment means for attaching said lens to an end of said bar, a screw having a second base on one side of said member having a pair of prongs extending through said aperture and beyond the side of said first member opposite said one side, said prongs being separated by a gap slightly wider than the thickness of said bar, the sides of said prongs opposite said gap being formed with a first taper tapering outwardly and formed with first threads and an annular nut having a head and a stem having an internal second taper formed with second threads mating with said first





threads, whereby tightening said nut forces said prongs toward each other to clamp said bar therebetween.

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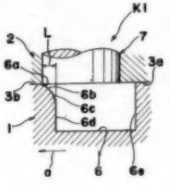
## 4,712,871
## POSITIONING MECHANISM FOR POSITIONING AUXILIARY OPTICAL DEVICE RELATIVE TO MAIN OPTICAL DEVICE AND THE AUXILIARY OPTICAL DEVICE

Junichi Tanii, and Yukio Maekawa, both of Sakai, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jul. 17, 1985, Ser. No. 755,898
Claims priority, application Japan, Jul. 23, 1984, 59-153500
Int. Cl.[4] G02B 7/02; B23Q 16/00
U.S. Cl. 350—257 18 Claims



1. A positioning mechanism for positioning an auxiliary optical device relative to a main optical device when mounting of said auxiliary optical device on said main optical device completes through movement of said auxiliary optical device relative to said main optical device in a predetermined direction with mount members of said main and auxiliary optical devices being in contact with one another, said mechanism comprising:

a positioning member provided on said main optical device and urged to project from said mount member of said main optical device;

a positioning recess provided on the mount member of said auxiliary optical device and having a width allowing engagement of said positioning member with a predetermined clearance, said positioning member and said positioning recess respectively including a front side face portion being at the front side with respect to the direction of said relative movement of said auxiliary optical device

and a rear side face portion being opposite to and in alignment with said front side face portion in the direction of said relative movement of said auxiliary optical device such that said engagement starts due to the urging of said positioning member immediately after said front side face portions of said positioning member and said positioning recess come in alignment with one another as a result of said relative movement of said auxiliary optical device and such that said rear face portions of said positioning member and positioning recess come into contact with one another with said clearance interposed between said front face portions of said positioning member and positioning recess when said engagement completes, and said front face portions of said positioning member and said positioning recess having a configuration which allows said front face portions not to contact one another during the advancement of said engagment when said relative movement of said auxiliary optical device is effected at a speed faster than a predetermined speed;

said configuration including:

a convex arcuate portion formed on said front side face portion of said positioning recess at an entrance part thereof;

a first straight slope portion formed on said front side face portion of said positioning recess at an inner portion thereof which is consecutive with said convex arcuate portion, said first straight slope portion having an inclination of not less than 60° with respect to the direction of said relative movement of said auxiliary optical device; and

a straight portion provided on at least said front side face portion of said positioning member and extending in the longitudinal direction of said positioning member perpendicular to said mount member of said main optical device, said straight portion forming a substantially right angle edge in a front elevational view at a distal end of said positioning member.

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## LIQUID CRYSTAL DEVICE

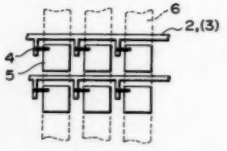
**Junichiro Kanbe, and Kazuo Yoshinaga, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 21, 1985, Ser. No. 714,618**

**Claims priority, application Japan, Mar. 26, 1984, 59-58016; Mar. 28, 1984, 59-61336; Jul. 20, 1984, 59-150651**

**Int. Cl.⁴ G02F 1/13**

**U.S. Cl. 350—333** **48 Claims**




1. A liquid crystal device, comprising:

a group of scanning electrodes;

a group of signal electrodes intersecting the scanning electrodes;

a ferroelectric liquid crystal having memorizable electrically polarized states interposed between the scanning electrodes and the signal electrodes, each of the intersections of the scanning electrodes and the signal electrodes defining a picture element; and

a nonlinear element having a nonlinear voltage-current characteristic corresponding to each picture element.

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## LIQUID CRYSTAL OPTICAL DEVICE

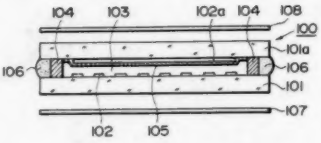
**Junichiro Kanbe, Yokohama, and Shinjiro Okada, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 4, 1985, Ser. No. 720,084**

**Claims priority, application Japan, Apr. 16, 1984, 59-76819**

**Int. Cl.⁴ G02F 1/13**

**U.S. Cl. 350—337** **30 Claims**




1. In a liquid crystal optical device comprising at least one polarizer, and a cell structure including a pair of base plates having electrodes thereon and a ferroelectric liquid crystal disposed between the base plates, said cell structure having been subjected to a monoaxial orientation treatment; the improvement wherein:

said ferroelectric liquid crystal is disposed in a layer thin enough to release its own helical structure, and

said polarizer is arranged such that the angle between the polarizing direction of the polarizer and the axial direction of the monoaxial orientation treatment is smaller than the angle between the axial direction of the monoaxial treatment and an average molecular axis direction of the ferroelectric liquid crystal under application of a polarity of voltage between the electrodes.

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**4,712,874**

## FERROELECTRIC LIQUID CRYSTAL DEVICE HAVING COLOR FILTERS ON ROW OR COLUMN ELECTRODES

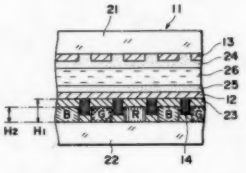
**Nobuyuki Sekimura, Kawasaki; Masaru Kamio, Atsugi; Hideaki Takao; Taiko Motoi, both of Sagamihara, and Tatsuo Murata, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 19, 1986, Ser. No. 943,502**

**Claims priority, application Japan, Dec. 25, 1985, 60-290423; Dec. 25, 1985, 60-290424**

**Int. Cl.⁴ G02F 1/13**

**U.S. Cl. 350—339 F** **26 Claims**




1. A ferroelectric liquid crystal device, comprising a pair of substrates each provided with a stripe electrode and a ferroelectric liquid crystal disposed between the substrates; at least one of the substrates having thereon a layer of discretely defined color filters disposed along the stripe electrode and electroconductive films disposed between the discretely defined color filters.

17. A ferroelectric liquid crystal device, comprising a pair of substrates each provided with a stripe electrode and a ferroelectric liquid crystal disposed between the substrates; at least one of the substrates having thereon a layer of discretely defined color filters disposed along the stripe electrode and insulating films disposed between the discretely defined color filters, and the difference between the height of said layer of

color filters and the height of the insulating films, respectively from the substrate face, being 1000 Å or less.

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**4,712,875**

## DIMENSIONS OF SPACER PARTICLES FOR A FERROELECTRIC LIQUID CRYSTAL DISPLAY

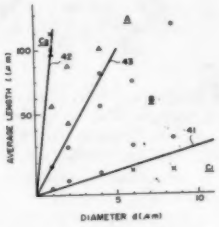
**Akira Tsuboyama, Tokyo; Kazuharu Katagiri, Tama, and Junichiro Kanbe, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed May 14, 1986, Ser. No. 862,979**

**Claims priority, application Japan, May 15, 1985, 60-103074**

**Int. Cl.⁴ G02F *1/133***

**U.S. Cl. 350—344** **11 Claims**




**1**. In a liquid crystal device comprising a pair of base plates and a ferroelectric chiral smectic liquid crystal disposed between the base plates, said pair of base plates being secured to each other to leave a spacing which is small enough to release the spiral structure of the ferroelectric chiral smectic liquid crystal due to the wall effect of the base plates; the improvement wherein fibrous spacers having a diameter d (μm) and an average length l satisfying the relationship of $3 \leqq l/d \leqq 100$, are disposed together with the ferroelectric chiral smectic liquid crystal.

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**4,712,876**

## DRIVING FERROELECTRIC LIQUID CRYSTAL PRINTERS VIA SHORT CIRCUITING

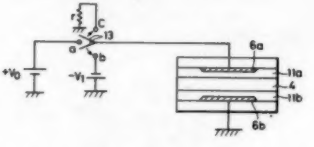
**Takao Umeda, Mito; Kazuya Ooishi, Toukai; Tatsuo Igawa, Kitaibaraki, and Yasuro Hori, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 5, 1985, Ser. No. 751,847**

**Claims priority, application Japan, Jul. 4, 1984, 59-138786**

**Int. Cl.⁴ G02F *1/137***

**U.S. Cl. 350—350 S** **2 Claims**




**1**. A method for driving a plurality of optical switch elements of a liquid crystal device wherein each of the optical switch elements includes a transparent ferroelectric liquid crystal material between opposed electrodes, the method comprising the steps of applying a positive or negative voltage between the opposed electrodes of each of the plurality of optical switch elements selectively during a first period so as to control the quantity of transmission light between the opposed electrodes, and effecting a short circuit by simultaneously applying a substantially zero voltage between the opposed electrodes of all of the plurality of optical switch elements during a second period so as to reduce the quantity of non-uniform existence of ions in the high dielectric material between the opposed electrodes, wherein the second period is a period at least one of before and after the first period, and the second period is a shorter time than the first period and wherein the plurality of switch elements form part of a printer for printing a desired pattern on print regions of a paper having non-print regions, and the second period wherein the substantially zero voltage is applied simultaneously between opposed electrodes of all of the plurality of optical switch elements corresponds to at least one of the non-print regions at the leading and trailing end portions of the paper among the non-print regions of the paper.

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**4,712,877**

## FERROELECTRIC DISPLAY PANEL OF VARYING THICKNESS AND DRIVING METHOD THEREFOR

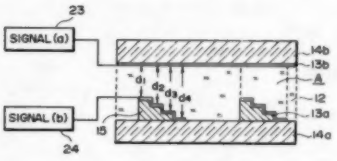
**Shinjiro Okada, Kawasaki; Junichiro Kanbe, Yokohama; Akira Tsuboyama, Tokyo, and Yutaka Inaba, Kawaguchi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 15, 1986, Ser. No. 819,070**

**Claims priority, application Japan, Jan. 18, 1985, 60-5847; Dec. 20, 1985, 60-287108**

**Int. Cl.⁴ G02F *1/13***

**U.S. Cl. 350—350 S** **41 Claims**




**1**. A liquid crystal device, comprising: a pair of oppositely spaced electrodes and a ferroelectric liquid crystal layer disposed between the pair of oppositely spaced electrodes, said ferroelectric liquid crystal layer having a varying thickness.

**24**. A driving method for a liquid crystal device of the type comprising a picture element formed by a first electrode, a second electrode oppositely spaced from the first electrode so as to form a varying spacing therebetween, and a ferroelectric liquid crystal disposed at the opposite portion between the first and second electrodes and having a varying layer thickness; said driving method comprising:

a first step of applying a voltage signal between the first and second electrodes for orienting a region extending over the whole area of the picture element to either one of a first and a second state and,

a second step of applying a pulse with a waveform corresponding to gradation information between the first and second electrodes to switch the state of a region defining a prescribed area of the picture element from one state resultant in the first step to the other state.

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**4,712,878**

## COLOR IMAGE FORMING APPARATUS COMPRISING FERROELECTRIC SMECTIC LIQUID CRYSTAL HAVING AT LEAST TWO STABLE STATES

**Osamu Taniguchi; Shinjiro Okada, both of Kawasaki, and Yujiro Ando, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 16, 1986, Ser. No. 819,400**

**Claims priority, application Japan, Jan. 18, 1985, 60-006716; Jan. 18, 1985, 60-006717**

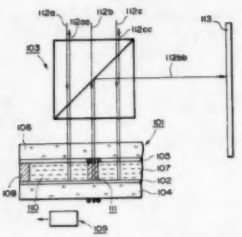
**Int. Cl.⁴ G02F *1/13***

**U.S. Cl. 350—350 S** **17 Claims**

**1**. An image-forming apparatus, comprising:

a liquid crystal device of a cell structure comprising an electroconductive member, an electric charge-accepting member, and a ferroelectric liquid crystal interposed between the electroconductive member and the electric charge-accepting member,

charging means for imparting an electric charge to the electric charge-accepting member sufficient to form an electric field exceeding the threshold voltage of the ferroelectric liquid crystal between the electric charge-accepting member and the electroconductive member, and



a multi-color optical filter disposed in the neighborhood of the electroconductive member and comprising a plurality of filter elements of which adjacent ones have mutually different spectral characteristics.

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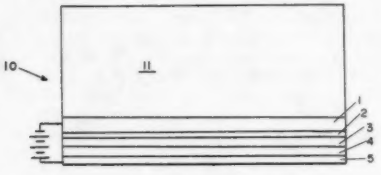
**4,712,879**

## ELECTROCHROMIC MIRROR

**Niall R. Lynam, and Kiok K. Seah, both of Holland, Mich., assignors to Donnelly Corporation, Holland, Mich.**

**Filed Apr. 2, 1986, Ser. No. 847,192**
**Int. Cl.[4] G02F** *1/01, 1/23*
**U.S. Cl. 350—357** **20 Claims**



1. An electrochromic vehicle mirror which can be alternatively darkened or lightened to decrease or increase reflectivity comprising in the order indicated:

a glass substrate;

a conductive coating thereon; one of an anodic electrochromic layer of nickel hydroxide and a cathodic electrochromic layer of tungsten oxide;

a solid electrolyte layer;

the other of said cathodic electrochromic layer and said anodic electrochromic layer; and

a layer of a reflective/conductive material;

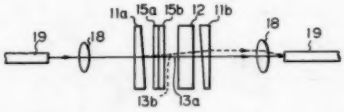
where said anodic nickel hydroxide electrochromic layer has a thickness of from about 300 to about 600 angstroms, said solid electrolyte layer has a thickness of from about 1000 to about 1500 angstroms and said cathodic tungsten oxide electrochromic layer has a thickness of from about 600 to about 1200 angstroms.

**4,712,880**

## POLARIZATION ROTATION COMPENSATOR AND OPTICAL ISOLATOR USING THE SAME

**Masataka Shirasaki, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Continuation of Ser. No. 508,547, Jun. 28, 1983, abandoned.**
**This application Aug. 25, 1986, Ser. No. 900,246**
**Claims priority, application Japan, Jun. 28, 1982, 57-109912; Jun. 28, 1982, 57-111013**
**Int. Cl.[4] G02F** *1/09;* **G02B** *27/28*
**U.S. Cl. 350—377** **11 Claims**



1. A device comprising:

a compensator which includes a half-wave plate and a quarter-wave plate arranged in a predetermined order with respect to a beam of plane-polarized incident light, the respective orientations of the principal axes of said plates with respect to the plane of polarization of said incident light being $\theta/2$ and $\theta$, said incident light being incident first on said half-wave plate, and

a rotator arranged in combination with said compensator, after said compensator with respect to said incident light, said rotator rotating the light passing therethrough by an amount that depends on wavelength, wherein $\theta$ is provided at an optimum angle to compensate the wavelength dependency of said rotator in the predetermined wavelength region, thus a plane-polarized output beam is provided from said compensator with a rotation of the plane of polarization from that of said incident light that depends on wavelength, and the rotation of the plane of polarization of said incident light, by the combination of said compensator and rotator, becomes independent of wavelength.

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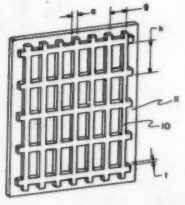
**4,712,881**

## BIREFRINGENT ARTIFICIAL DIELECTRIC STRUCTURES

**Richard R. Shurtz, II, Oakton, Va., and Edward J. Sharp, Fort Washington, Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Jun. 21, 1985, Ser. No. 747,214**
**Int. Cl.[4] G02B** *5/30, 27/28*
**U.S. Cl. 350—406** **3 Claims**



1. An artificial dielectric device for electromagnetic radiation, composed of a regular planar pattern of highly-conductive metal film on an insulating and transparent substrate, wherein said pattern comprises cells with two-fold symmetry about an axis normal to the plane of said pattern, wherein said device is birefringent to said radiation.

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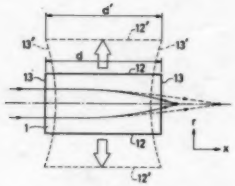
## VARIABLE FOCAL LENGTH LENS

Takeshi Baba, Yokohama; Hiroyuki Imataki, Kawasaki; Masayuki Usui; Takashi Serizawa, both of Yokohama, and Hiroyasu Nose, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 27, 1984, Ser. No. 686,756
Claims priority, application Japan, Jan. 5, 1984, 59-45
Int. Cl.[4] G02B *15/00, 3/14*
U.S. Cl. 350—413 8 Claims



1. A variable focal length lens comprising:

a lens having a distribution of refractive index in which the refractive index varies in a direction perpendicular to the optic axis thereof, said lens comprising a deformable elastic member; and

means for changing the shape of the distribution of refractive index by applying to said lens a force in the direction perpendicular to the optic axis to thereby deform said lens.

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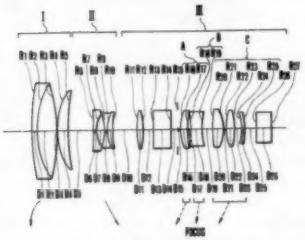
## REAR FOCUS ZOOM LENS

Masatake Kato, Tokyo; Sadahiko Tsuji, and Toshiaki Asano, both of Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 17, 1984, Ser. No. 571,481
Claims priority, application Japan, Jan. 18, 1983, 58-6058
Int. Cl.[4] G02B *15/14, 13/18*
U.S. Cl. 350—427 20 Claims



1. A zoom lens of the rear focusing type comprising:

from front to rear, a magnification varying assembly having a plurality of movable lens components movable during zooming and stationary during focusing, and an image forming assembly stationary during zooming, said image forming assembly including a lens component B having negative refractive power and movable at a time of focusing, a lens component A on the object side of said lens component B and movable when focusing, and a lens component C on the image side of said lens group B and movable when focusing.

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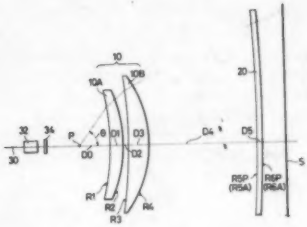
## LENS SYSTEM FOR DEFLECTED LIGHT BEAM

Nobuo Sakuma, Tokyo, and Keinichi Takanashi, Kanagawa, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jan. 27, 1986, Ser. No. 823,002
Claims priority, application Japan, Jan. 30, 1985, 60-016002
Int. Cl.[4] G02B *13/18, 9/12, 26/10*
U.S. Cl. 350—434 10 Claims



1. A light beam scanner comprising:

means for producing a scanning light beam; and

a lens system including two positive-meniscus lenses and a toroidal lens, said two positive-meniscus lenses having their concave surfaces directed towards said means for producing a scanning light beam, said two positive-meniscus lenses havign an effective deflection angle of at least 50°, said toroidal lens correcting for surface irregularity and curvature of field.

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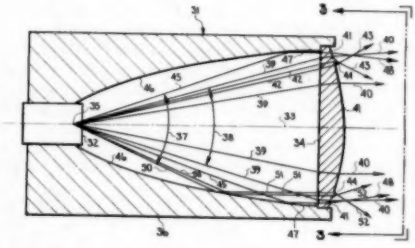
## LASER DIODE OPTICAL SYSTEM

Christopher Dawson, Glendora; Fritz W. Healey, and Leo O. Taylor, both of Alta Loma, all of Calif., assignors to Loral Electro-Optical Systems, Inc., Pasadena, Calif.

Filed Oct. 31, 1985, Ser. No. 793,666
Int. Cl.[4] G02B *17/00*
U.S. Cl. 350—443 10 Claims



1. A laser diode optical system including:

a laser diode having non-circular beam emitted from a diode emitter junction and having a peak energy centered on an optical axis,

a collimating lens spaced from the laser diode with its focus at the diode emitter on the optical axis to intercept direct energy from the laser diode and produce a centralized collimated beam on the optical axis through the laser diode and lens,

a generally paraboloidal reflector coaxially disposed about the laser diode emitted beam collimating the portion of the emitted beam outside the included angle subtended by the lens, the collimated energy from the reflector being refracted through the periphery of the collimating lens to direct the collimated energy from the reflector into a

hollow convergent-divergent conical off-axis beam coaxial about the centralized collimated beam,

a plurality of spaced energy diffusing elements on a surface of the lens intercepting and diffusing direct laser diode energy impinging the lens, and also intercepting and diffusing laser diode energy from the reflector, and producing a spaced pattern of overlapping diffused beams forming a generally toroidal beam coaxially disposed about the centralized collimated beam and having a cross-sectional shape elongated in the direction of the collimated beam.

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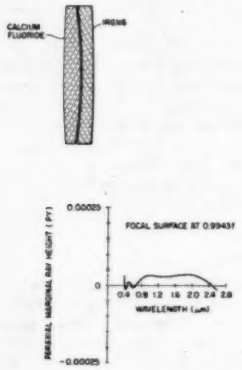
## LENS DOUBLET COLOR-CORRECTED FOR VISIBLE AND NEAR-INFRARED WAVELENGTHS

**Romeo I. Mercado, San Jose, Calif., assignor to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.**

**Continuation of Ser. No. 676,492, Nov. 29, 1984, abandoned.**
**This application Nov. 14, 1986, Ser. No. 931,003**
**Int. Cl.[4] G02B** *3/00*
**U.S. Cl. 350—482** **10 Claims**




1. A lens doublet comprising a first lens element and a second lens element, said first and second lens elements being made of different refractive materials, each of said refractive materials having a characteristic index of refraction, the indices of refraction of said refractive materials being related to each other so that color correction of said lens doublet at four discrete wavelengths is possible, said first and second lens elements being configured and disposed with respect to each other so that said lens doublet is simultaneously color-corrected for four visible wavelengths and one infrared wavelength at one focal surface, and for one visible wavelength and four infrared wavelengths at another focal surface.

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**4,712,887**

## OPTICAL SYSTEM FOR FAST ACCESS OPTICAL DATA STORAGE DEVICE

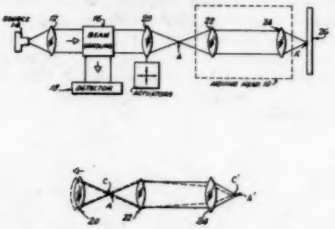
**James W. Baer, Boulder, Colo., assignor to Dazar Corporation, Boulder, Colo.**

**Filed Dec. 20, 1985, Ser. No. 811,380**
**Int. Cl.[4] G02B** *26/08*
**U.S. Cl. 350—484** **14 Claims**

1. An optical system for a fast access optical storage device, said system being used for passing an energy beam from a light source to a spot on the recording surface of a recording medium, said medium rotating about an axis, comprising:

a non-moving portion of said optical system, said non-moving portion including first optics and actuators for focus control and fine tracking control of said system, said actuators operating to move portions of said first optics;

a moving portion of said optical system said moving portion including second optics having a plurality of elements, said moving portion being subject to movement as a monolithic component over said recording surface, physi-



cal relationships between said plurality of elements being fixed.

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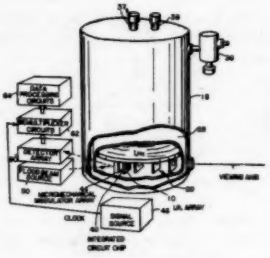
## SPATIAL LIGHT MODULATOR SYSTEMS

**Robert E. Brooks, Manhattan Beach, Calif., assignor to TRW Inc., Redondo Beach, Calif.**

**Filed Aug. 4, 1986, Ser. No. 892,665**
**Int. Cl.[4] G02B** *26/08, 26/00;* **H01L** *25/00*
**U.S. Cl. 350—486** **23 Claims**



14. A system responsive tot he amplitudes of individual picture elements in incoming radiant energy image patterns, comprising:

a plurality of radiant energy detectors distributed in an array throughout an image are and each responsive to intensity variations corresponding to a different picture element in the image patterns;

drive circuit means responsive to one or more detectors and generating a drive signal in response thereto;

a plurality of spatial light modulators in an object plane, each deflectable to a limit position for a period of time in response to a different signal;

flood beam means illuminating the light modulators to direct light reflected therefrom toward a remote focal plane; and

a plurality of light detectors positioned at the focal plane to be individually responsive to light from different ones of the fully deflected modulators.

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**4,712,889**

## PHOTOMETER FOR USE WITH A MICROSCOPE

**Klaus P. Schindl, Vienna, Austria, assignor to C. Reichert Optische Werke AG, Vienna, Austria**

**Filed Nov. 20, 1985, Ser. No. 799,888**
**Claims priority, application Fed. Rep. of Germany, Nov. 30, 1984, 3443728**
**Int. Cl.[4] G02B** *21/18, 21/06;* **G01J** *1/42*
**U.S. Cl. 350—511** **8 Claims**

1. A photometer for use with a microscope having an object

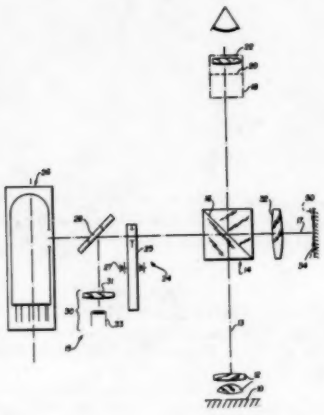
plane, an image plane and an optical axis between said planes, which photometer comprises:

an optical dividing means adapted to be disposed in said optical axis between said microscope object and image planes;

a reflective element having a reflecting surface;

a pin hole occluder adapted to be arranged on the opposite side of the optical dividing means to the reflective element;

an optical imaging device for providing an image of the pin hole occluder on the reflecting surface;



a light source;

a semi-reflective element for reflecting light from the light source to the optical dividing means;

a detector arranged in an optical axis including the semi-reflective element, pin hole occluder, optical dividing means, optical imaging device and reflective element;

the object and image planes of the microscope and the reflecting surface of the reflective element being conjugate planes.

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**4,712,890**

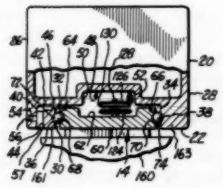
## APPARATUS FOR ADJUSTING PLAY IN A PRECISION OPTICAL INSTRUMENT

**Michael H. Dobner, Webster, N.Y., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.**

**Filed Sep. 14, 1984, Ser. No. 650,928**

**Int. Cl.[4] G02B *21/26;* F16C *29/00***

**U.S. Cl. 350—530** **8 Claims**



**1.** In an optical instrument, such as a microscope, apparatus for adjusting play between a support column and a member such as a stage or optical head assembly mounted for linear movement with respect to said support column, comprising:

(a) bearing means mounted between the support column and the linearly movable member; and

(b) adjustment means for enabling the engagement between the support column, said bearing means and the linearly movable member to be altered, said adjustment means including:

(i) a pivotable member coupled to the support column by a hinged section integrally formed therebetween, and

(ii) means to pivot said pivotable member either toward or away from said linearly movable member to thereby adjust the play between said linearly movable member and said support column.

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**4,712,891**

## VEHICLE DOOR MIRROR WITH HOUSING AND BASE PART INCLUDING A SOFT FLEXIBLE MATERIAL

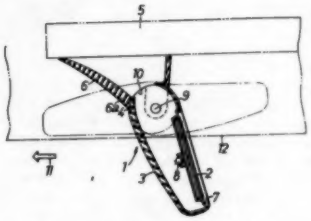
**Masashi Midorikawa, Wako, and Isamu Inoh, Tokyo, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 17, 1986, Ser. No. 875,136**

**Claims priority, application Japan, Jun. 18, 1985, 60-132196; Jun. 18, 1985, 60-132197**

**Int. Cl.[4] G02B *7/18;* B60R *1/06***

**U.S. Cl. 350—604** **9 Claims**



**1.** A door mirror of a vehicle comprising a base part mounted to a vehicle body and a housing which is supported on the base part rotatably around a substantially vertical axis and which is provided with a mirror, wherein portions of the base part and the housing that come into abutment against each other when the housing is rotated towards a front of the vehicle are both formed of a soft material having a flexibility and are, at the time of rotation towards the vehicle front, subject to resilient deformation.

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**4,712,892**

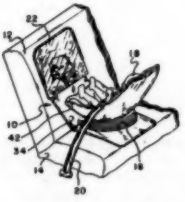
## REAR SEAT MIRROR

**Ann M. Masucci, 905 Lichtenthal Ave., Delran, N.J. 08075**

**Filed Oct. 10, 1986, Ser. No. 917,525**

**Int. Cl.[4] G02B *7/18;* B60R *1/00***

**U.S. Cl. 350—631** **6 Claims**



**1.** A forward viewing arrangement for an automobile comprising:

an automobile back seat including a generally horizontal seat cushion and a generally vertically extending seat back;

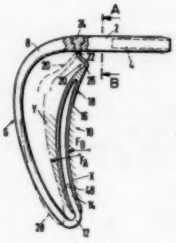
a non-glass mirror, and

means for mounting said mirror to said automobile such that said mirror lies substantially against said seat back adjacent the top thereof and wherein said mirror faces the front of said automobile.

## 4,712,893
## TEMPLE END PIECE FOR A TEMPLE OF A SPECTACLE FRAME

**Wilhelm Anger, Chesa Pas-Chura, 7500 St. Moritz-Suvretta, Switzerland**

**Filed Dec. 10, 1985, Ser. No. 807,527**
**Claims priority, application Fed. Rep. of Germany, Jul. 12, 1985, 3525006**
**Int. Cl.[4] G02C 5/14**
**U.S. Cl. 351—123** **14 Claims**



1. Temple end piece for a temple of a spectacle frame comprising an essentially straight first segment extending in the longitudinal direction of the temple, an elongated substantially arcuately shaped fitting segment which is intended for resting between the head and the ear and which extends downwardly with respect to the first segment, and a connecting segment extending from the first segment to the fitting segment and connecting these segments to one another, said connecting segment being connected to the fitting segment at or below the longitudinal middle of the latter and whereby at least the upper half of the fitting segment forms an end region protruding out from the transition region between the connecting segment and the fitting segment upward in the direction toward the first segment, which end region is deflectable at least essentially to the rear in the direction toward the connecting segment, and an elongated, flexible element attached at its one end to the upper end of the fitting segment, and attached at its other end to the first segment where by the flexible element permits movement of the upper end of the fitting segment rearwardly relative to the first segment.

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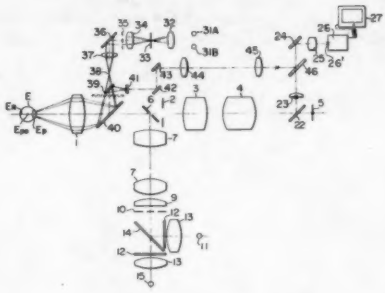
## 4,712,894
## OPHTHALMOSCOPIC INSTRUMENT HAVING WORKING POSITION DETECTING MEANS

**Kazuo Nunokawa, Tokyo, Japan, assignor to Tokyo Kogaku Kikai Kabushiki Kaisha, Tokyo, Japan**

**Continuation-in-part of Ser. No. 304,575, Sep. 22, 1981, Pat. No. 4,511,227. This application Mar. 10, 1983, Ser. No. 473,454**
**Claims priority, application Japan, Mar. 15, 1982, 57-40405**
**Int. Cl.[4] A61B 3/14**
**U.S. Cl. 351—208** **5 Claims**

1. An ophthalmoscopic instrument comprising objective lens means having an optical axis and adapted to be positioned to confront a patient's eye at a working distance, said patient's eye having a cornea with a center of curvature, an observing optical system adapted to focus a light beam reflected from the eye and passing through the objective lens means on an image plane, means for detecting that the eye is properly positioned with respect to the objective lens means, said detecting means including a single target mark, a target mark image projection system adapted to project said target mark image by way of at least two light beams crossing each other on the optical axis of the objective lens means so that a target image is formed by each of the beams at the center of curvature of the cornea of the eye when the eye is properly positioned with respect to the objective lens means, a target mark image plane wherein target mark images are formed by mirror reflection, at the cornea, of the light beams projected through the target mark projection system when the patient's eye is properly positioned, a target mark image observation system for observing the target mark images on the target mark image plan in superposition with a reference mark, whereby said target mark images on the target



mark image plane are formed in superposition with said reference mark at predetermined positions when the eye is properly positioned with respect to the objective lens means.

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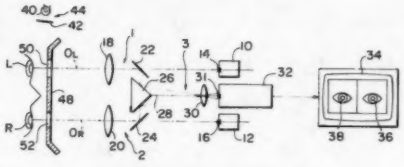
## 4,712,895
## OCULAR POSITION MEASURING APPARATUS

**Kiichi Kamiyama, and Yasuo Kato, both of Tokyo, Japan, assignors to Tokyo Kogaku Kikai Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 25, 1984, Ser. No. 664,507**
**Claims priority, application Japan, Oct. 26, 1983, 58-200519**
**Int. Cl.[4] A61B 3/02, 3/10**
**U.S. Cl. 351—243** **2 Claims**



1. An ocular position measuring apparatus for determining the heterophoria or strabismus of a patient's eyes, having a pair of fixation mark means for projecting fixation marks of visible rays into patient's eyes, a pair of first half mirrors located between respective ones of the eyes and respective ones of the fixation mark means along right and left fixation axes, a pair of rotatable variable deflection prisms located between respective ones of the first half mirrors and the fixation mark means along the right and left fixation axes, a second pair of half mirrors located between the variable deflection prisms and the fixation mark means along the right and left fixation axes and capable of reflecting infrared rays and transmitting visible rays, a pair of infrared mark members located along reflecting axes of the second pair of half mirrors to project images of the infrared marks on the eyes, position detecting means for detecting position of the image of the infrared marks produced by light beams reflected by the eyes, a control circuit for controlling rotation of the variable deflection prisms when the image of the infrared mark moves in response to the flickering of one of the fixation marks, whereby quantity and direction or angle of heterophoria and strabismus are detected from the position of the infrared mark and direction or angle and quantity of deflection of the variable deflection prisms when the image of the infrared mark does not move in response to flickering of the fixation mark.

4,712,896

## PHOTOSETTING APPARATUS

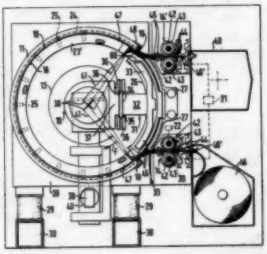
**Bernd Holthusen, Hamburg, Fed. Rep. of Germany, assignor to Scangraphic Dr. Boger GmbH, Fed. Rep. of Germany**

**Filed Feb. 11, 1987, Ser. No. 13,308**

**Claims priority, application Fed. Rep. of Germany, Feb. 12, 1986, 3604360**

**Int. Cl.[4] B41B** *13/00*

**U.S. Cl. 354—5** **10 Claims**



1. Photosetting apparatus comprising a segment of a regular cylinder on which a sheet-like photosensitive material can be fixed with the photosensitive layer at the inside, and a rotary mirror arranged on the axis of the segment of the regular cylinder, wherein the rotary mirror is illuminated by a laser beam modulated in accordance with the signs to be set and wherein the rotary mirror is arranged on a carriage which is controllably displaceable along the axis of the segment of the regular cylinder in such a way that the mirror generates a radial scanning beam with its origin on the rotary mirror and on the axis of the segment of the regular cylinder, with the scanning beam executing a rapid periodic scanning movement substantially in the circumferential direction of the segment of the regular cylinder, whereby an exposure region on the photosensitive material extending over the larger part of the circumference and the whole or part of the axial length of the segment of the regular cylinder is exposed with the marks to be set, wherein the photosensitive material can be laid against the cylindrical inner side of the segment of the regular cylinder, which preferably consists of light impermeable material, by the provision before and after the exposure region of the segment of the regular cylinder, as seen in the circumferential direction, of respective force transmitting devices which exert a restricted compressive force on the photosensitive material; wherein guide elements also engage the side edges of the photosensitive material radially from the interior; and wherein an end face abutment engages at least one side edge of the photosensitive material, characterised in that the guide elements (**16**) and two end face abutments (**18**) are formed on two guide rings (**23, 23'**) which are inserted axially spaced apart into the segment (**11**) of the regular cylinder, with the external diameter of the guide rings corresponding to the internal diameter of the segment (**11**) of the regular cylinder, and with the rings being mounted on the segment (**11**) of the regular cylinder so that they are axially adjustable relative to one another.

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4,712,897

## DEVICE FOR ADJUSTMENT OF THE VIEWFINDER EYEPIECE OF A CAMERA

**Rolf Crema, Greifenthal, Fed. Rep. of Germany, assignor to Ernst Leitz Wetzlar GmbH, Wetzlar, Fed. Rep. of Germany**

**Filed Jul. 21, 1986, Ser. No. 887,226**

**Claims priority, application Fed. Rep. of Germany, Jul. 27, 1985, 3526938**

**Int. Cl.[4] G03B** *13/06*

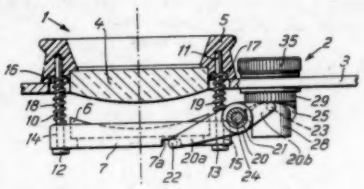
**U.S. Cl. 354—219** **11 Claims**

1. A device for adjusting a viewfinder eyepiece of a camera, comprising:

a viewfinder eyepiece mounted in an axially movable manner in the camera, and

means for axially displacing the viewfinder eyepiece, wherein said axial displacing means comprises:

an actuating knob which has a shaft;



a sleeve surrounding said shaft and which is normally rotatable with respect to said shaft, said sleeve including a radial cam;

a lever operatively connected between the radial cam and the viewfinder eyepiece; and

means for selectively coupling and decoupling said shaft to said sleeve.

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4,712,898

## CAMERA BATTERY COVER FOR A CAMERA HAVING A CHAMBER FOR A BUILT IN BATTERY

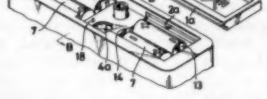
**Shosuke Haraguchi, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 5, 1985, Ser. No. 805,985**

**Claims priority, application Japan, Dec. 5, 1984, 59-255662; Dec. 10, 1984, 59-260521**

**Int. Cl.[4] G03B** *17/02*

**U.S. Cl. 354—288** **15 Claims**



1. A camera comprising:

(a) a camera body;

(b) a battery chamber formed in said camera body;

(c) a battery cover for covering said battery chamber, at least part of said battery cover being an electrically conductive part;

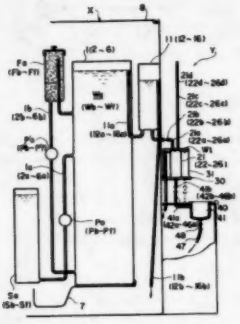
(d) connecting means for electrically connecting said camera body with said electrically conductive part in a state where said battery cover is closed; and

(e) detecting means for detecting closure of said battery cover, said detecting means detecting a connecting state of said connecting means with said electrically conductive part to detect the closure of said battery cover.

## 4,712,899
## PHOTOSENSITIVE MATERIAL TREATING APPARATUS

Kanichi Nishimoto, Wakayama, Japan, assignor to Noritsu Kenkyu Center Co., Ltd., Wakayama, Japan

Filed Feb. 3, 1987, Ser. No. 10,421
Claims priority, application Japan, Feb. 10, 1986, 61-16829[U]; Feb. 10, 1986, 61-16830[U]; Feb. 10, 1986, 61-16831[U]; Jun. 16, 1986, 61-90565[U]
Int. Cl.[4] G03D *3/06*
U.S. Cl. 354—316 14 Claims



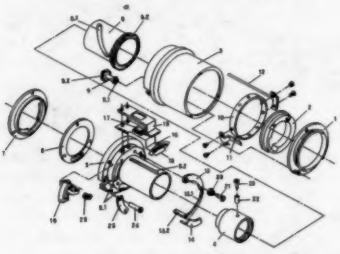
1. A photosensitive material treating apparatus comprising;
a treating unit including a series of treating liquid baths for carrying out a series of developing treatments such as developing, bleaching, fixing and others for photosensitive material such as strip of photographic film, printing paper or the like, said treating unit being housed in a dark box and each of said treating liquid baths being equipped with a treating liquid supply device,
a disc film treating unit including a plurality of tanks into which specific treating liquid separately introduced from the first-mentioned treating unit for treating several number of disc films is stored, a hot water bath for heating said tanks in order to maintain a temperature of each of treating liquids at temperature suitable for treating said disc films and a single disc film treating tank into which said treating liquids are successively supplied from said tanks in accordance with a predetermined order of treatments for the disc films, and
said disc film treating unit being attached to the first-mentioned treating unit in the side-by-side relation.

## 4,712,900
## APPARATUS FOR CONVERTING INTERCHANGEABLE CAMERA LENS FROM MANUAL INTO AUTOFOCUS

Hideo Hamano, C-524, Dai-2 Koporasu, Kibougaoka 144-1, Nakakibougaoka, Asahi-Ku, Kanagawa-Ken; Jun Sugita, 206, Fuji-sou, 4-3-14 Nishi-ikuta, Tama-Ku, Kawasaki-Shi Kanagawa-Ken, and Takashi Watanabe, Haimu, Ayabe 2F, 2-25-49 Honmachi, Fuchu-Shi, Tokyo, all of Japan

Filed Dec. 12, 1986, Ser. No. 940,546
Claims priority, application Japan, Dec. 14, 1985, 60-280217
Int. Cl.[4] G03B *3/00*
U.S. Cl. 354—400 15 Claims

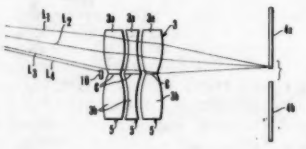
1. An apparatus for converting a manual focus interchangeable lens having an associated focal length into an autofocus type lens for use with a microprocessor based autofocus single lens reflex camera for providing autofocus photography with said manual focus interchangeable lens, said camera having a camera body, said camera body comprising focus detecting means and focus driving means for providing a focus driving signal under control of said focus detecting means, said focus detecting means comprising said microprocessor, said camera body having a lens mounting means for mounting an interchangeable autofocus lens to said camera body in driving relation with said focus driving means and in electrical connection with said focus detecting means for providing lens driving power to said interchangeable autofocus lens in response to a signal from said focus detecting means; said converter apparatus comprising first mounting means disposed at one end thereof for mounting said converter apparatus to said camera body lens mounting means and second mounting means disposed at the opposite end thereof for mounting said manual focus interchangeable lens to said converter apparatus, said manual focus interchangeable lens having an associated camera mounting different from said camera lens mounting, said converter apparatus further comprising a lens system for converting said focal length of said manual focus interchangeable lens, a driving means couplable to said focus driving means in driving engagement therewith for driving said converter lens system along the optical axis thereof in response to said focus driving signal from said camera body, lens data conversion and output means for converting lens data representing the characteristics of said manual focus interchangeable lens into digital representations thereof for electrically providing a bit pattern for transmission of said lens data to said camera body microprocessor through said camera lens mounting means, and aperture control and conversion means for providing aperture control of said interchangeable lens in response to aperture control data derived from said camera body, said lens data conversion and output means comprising means for detecting minimum aperture value of said manual focus interchangeable lens and for providing a full/minimum aperture value lens data characteristic therefrom based on said detected minimum aperture value for said manual focus interchangeable lens.



## 4,712,901
## SHARP FOCUS DETECTING DEVICE

Keiji Ohtaka, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 576,858, Feb. 3, 1984, abandoned. This application Dec. 4, 1985, Ser. No. 805,404
Claims priority, application Japan, Feb. 5, 1983, 58-15699[U]
Int. Cl.[4] G03B *3/00*
U.S. Cl. 354—407 6 Claims



1. A focus detecting device for detecting a focus condition of an objective lens, comprising:
(a) image forming means for forming a plurality of images on the basis of respective light beams passing through different areas of a pupil of said objective lens, said image forming means cutting off part of outer peripheries of lens

components for combining the cut off components at their cut off portions into a united form;

(b) photo-electric transducing means receptive of all the images formed by said lens components for producing a signal for distinguishing between focus conditions of said objective lens; and

(c) light shielding means for preventing light beams incident upon one lens component of said image forming means from influencing the image formed by the other lens component;

and wherein said light shielding means is positioned near the contacted portion of each of the lens components.

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4,712,902

## DEVICE FOR INDICATING AN OBJECT DISTANCE FOR FLASH PHOTOGRAPHY

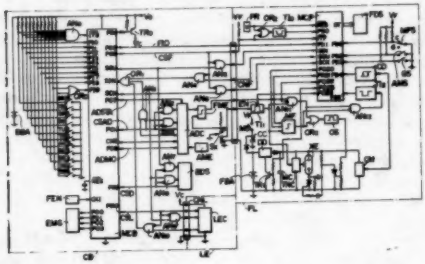
Hiroshi Hosomizu, Nara; Kenji Tsuji, Amagasaki, and Makoto Kamiya, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jan. 17, 1986, Ser. No. 819,695

Claims priority, application Japan, Jan. 18, 1985, 60-6016[U]

Int. Cl.[4] G03B *15/05*

U.S. Cl. 354—416 9 Claims



1. A flash photography system comprising a camera and an electronic flash device detachably coupled to said camera; said camera comprising:

means for generating a first data indicative of a set film speed, a second data indicative of a set amount of exposure to be compensated from a predetermined amount of exposure, and a third data indicative of a value of diaphragm aperture to be controlled;

a data transmission means for transmitting the first through third data to said flash device; and

means for generating a firing signal for flash firing and transmitting the signal to said flash device;

said flash device comprising:

a light emitter for emitting a light for flash photography;

means for receiving the firing signal and effecting the control for the flash light emission in response to the received firing signal;

a data receiving means for receiving the first through third data fed from said camera;

a data output means for generating a fourth data indicative of the flash light amount to be emitted from said light emitter;

a calculation means responsive to the first through fourth data for calculating a camera-to-object distance for flash photography; and

a display means for displaying the calculated distance.

4,712,903

## METHOD AND CIRCUIT ARRANGEMENT FOR THE AUTOMATIC DETERMINATION OF AN EXPOSURE VALUE

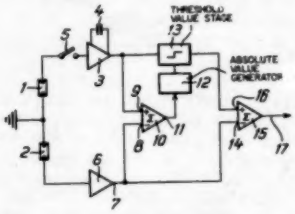
Klaus-Dieter Schaefer, Braunfels, Fed. Rep. of Germany, assignor to Ernst Leitz Wetzlar GmbH, Wetzlar, Fed. Rep. of Germany

Filed Dec. 2, 1986, Ser. No. 936,763

Claims priority, application Fed. Rep. of Germany, Dec. 2, 1985, 3542511

Int. Cl.[4] G03B *7/08*

U.S. Cl. 354—433 10 Claims




1. A method for the automatic determination of an exposure value for the exposure control in a photographic camera, comprising the steps of:

(a) generating electrical signals from an integrated brightness measurement of an object to be exposed;

(b) generating electrical signals from a selective brightness measurement of the object;

(c) comparing the integrated brightness electrical signal with the selective brightness electrical signal to generate a difference value;

(d) comparing the difference value with a threshold value to generate a correction value; and

(e) comparing the correction value with the integrated brightness electrical signal to generate an exposure value.

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4,712,904

## CAMERA SYSTEM

Nobuyuki Taniguchi, Tondabayashi; Masatake Niwa, Sakai; Akira Fujii, Osaka; Takeo Hoda, Sakai; Masaaki Nakai, Nara; Minoru Sekida, Sakai, and Masayoshi Sahara, Sennan, all of Japan, assignors to Minolta Camera KK, Japan

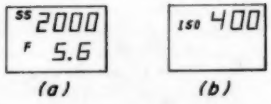
Division of Ser. No. 634,474, Jul. 25, 1984, Pat. No. 4,621,914.

This application Jul. 23, 1986, Ser. No. 888,600

Claims priority, application Japan, Jul. 27, 1983, 58-138129; Jul. 29, 1983, 58-139600; Aug. 8, 1983, 58-144547; Aug. 8, 1983, 58-144549; Aug. 17, 1983, 58-150572; Jun. 22, 1984, 59-129572; Jun. 25, 1984, 59-131452; Jun. 25, 1984, 59-131453

Int. Cl.[4] G03B *17/18, 1/60*

U.S. Cl. 354—475 5 Claims




1. A camera functioning with film speed data, comprising:

means for introducing film speed data, including first means responsive to a manual operation for setting desired film speed data;

second means responsive to a manual operation for setting exposure time data;

first means for alternatively indicating one of the film speed data or the exposure time data;

second means for indicating additional data relating to exposure; and

means, responsive to said first setting means, for controlling said first and second indicating means, including means for selecting the film speed data to appear at said first indicating means when said first setting means is manually operated, means for selecting the exposure time data to appear at said first indicating means when said first setting means is not manually operated, and means for disabling said second indicating means so that film speed data appears without appearance of the additional data when said first setting means is manually operated, and for enabling said second indicating means so that the additional data appears with the exposure time data when said first setting means is not manually operated.

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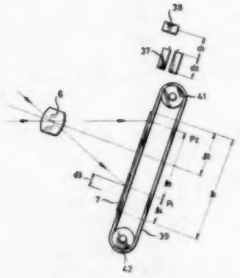
**4,712,905**

## METHOD OF PREVENTING THE OCCURRENCE OF BLACKENED MARGINS ON PHOTOSENSITIVE SHEETS IN ELECTROPHOTOGRAPHY

**Tatsunari Arito, and Yu Tojo, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Oct. 15, 1985, Ser. No. 792,694**
**Claims priority, application Japan, Oct. 15, 1984, 59-214180**
**Int. Cl.[4] G03G** *15/048*
**U.S. Cl. 355—3 CH** **5 Claims**



1. A method of charging a photosensitive sheet with electricity by charging means disposed before an exposure position in an electrophotographic apparatus while the photosensitive sheet is transported toward the exposure position by transporting means so as to render the photosensitive sheet electrophotosensitive, said method comprising the steps of:

determining on the basis of the extent of an image area of said photosensitive sheet a first transporting length by which said photosensitive sheet is to be moved until a forward end of the image area of said photosensitive sheet within which an image can be formed is charged with electricity by said charging means after the arrival of a leading end of said photosensitive sheet at a specified position and a second transporting length by which the photosensitive sheet is to be further transported until a rear end of said image area of said photosensitive sheet is charged with electricity by said charging means;

actuating said charging means to turn ON upon said photosensitive sheet having been transported by said first transporting length by said transporting means; and

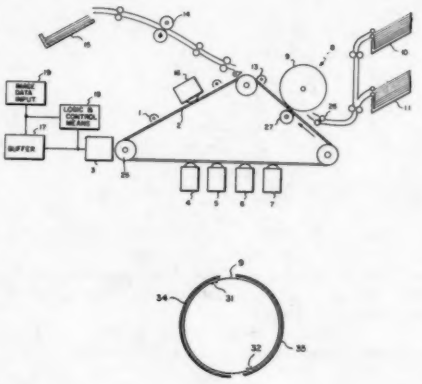
deactuating said charging means to turn OFF upon sid photosensitive sheet have been transported by said second transporting length by said transporting means, thereby preventing any area of said photosensitive sheet which is not part of the image area from being charged with electricity so as to prevent blackened margins on the photosensitive sheet.

**4,712,906**

## ELECTROSTATOGRAPHIC APPARATUS HAVING A TRANSFER DRUM

**Rose M. Bothner, and James L. Butler, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jan. 27, 1987, Ser. No. 7,036**
**Int. Cl.[4] G03G** *15/16, 15/01*
**U.S. Cl. 355—3 TR** **17 Claims**






1. In a transfer apparatus, for an electrostatographic copier, printer or the like, for transferring a plurality of toner images, electrostatically held to a moving image member, to copy sheets which copy sheets are moved to said transfer apparatus in timed relation with the arrival of the toner images to be transferred, said transfer apparatus including a transfer drum having means for securing a first copy sheet to the periphery of said drum and means for rotating the drum to bring the secured copy sheet into transfer relation with more than one of said images as said images are moved by the image member past the transfer apparatus, to transfer said more than one images in registration to the first copy sheet;

the improvement wherein said transfer drum includes means for securing a second copy sheet thereto to receive, in registration, its own set of toner images from the image member, during said rotation of the transfer drum.

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**4,712,907**

## SEQUENCING MEANS FOR PHOTOCOPYING PROCESSES

**Joseph Weinberger, Brunswick, N.J.; Gary S. Bricault, Rochester, N.Y.; David Gruber, Rochester, N.Y., and Eleonora Rakover, Rochester, N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Nov. 1, 1985, Ser. No. 794,129**
**Int. Cl.[4] G03G** *15/00*
**U.S. Cl. 355—7** **5 Claims**

1. An electrophotographic printing machine for reproducing an original document with a copy thereof having additional indicia thereon, including:

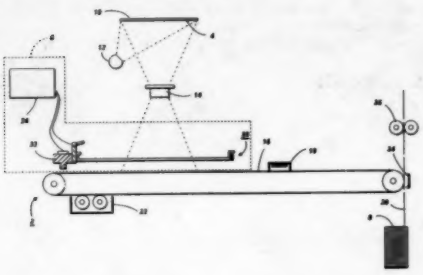
a photoconductive member;

means for charging at least a portion of said photoconductive member to a substantially uniform potential;

means for illuminating selectively the charged portion of said photoconductive to discharge selectively the charged portion of said photoconductive member to record an electrostatic latent image on said photoconductive member corresponding substantially to the original document being reproduced;

means for masking a region of the charged portion of said photoconductive member discharged normally by said

illuminating means to prevent the discharge thereof by said illuminating means; and



means for discharging selectively the masked region of the charged portion of said photoconductive member to record an electrostatic latent image thereon corresponding to the additional indicia.

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**4,712,908**

## IMAGE FORMING APPARATUS

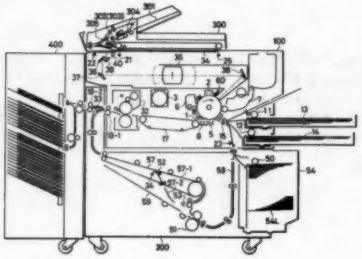
**Tomobumi Nakayama; Toshihiko Mori, both of Tokyo; Masayuki Hirose, Yokohama; Toru Ohbuchi, Yokohama; Masanori Miyata, Yokohama; Shinichi Nakamura, and Takeshi Honjo, both of Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 17, 1986, Ser. No. 908,254**

**Claims priority, application Japan, Sep. 19, 1985, 60-207022**

**Int. Cl.[4] G03G** *15/00*

**U.S. Cl. 355—14 SH** **15 Claims**



1. An image forming apparatus comprising:

means for forming images onto one sheet a plurality of times, in which said image forming means has means for temporarily enclosing the sheet on which the images are formed and further forms images onto the sheet enclosed in said enclosing means;

means for setting the number of sheets to be formed with images; and

means which, in the case where the number of sheets which is set by said setting means is larger than the number of sheets which can be enclosed into said enclosing means, controls said image forming means in order to divide the images into the images as many as the number of image forming times below said number of sheets which can be enclosed and to form the images.

**4,712,909**

## CRT COMPOSITE IMAGE PRINTING METHOD AND APPARATUS

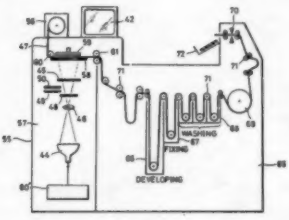
**Yuji Oshikoshi, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Aug. 21, 1986, Ser. No. 898,584**

**Claims priority, application Japan, Aug. 21, 1985, 60-181686; Aug. 26, 1985, 60-185795; Sep. 17, 1985, 60-203536**

**Int. Cl.[4] G03B** *27/80*

**U.S. Cl. 355—20** **16 Claims**




1. An apparatus for making a print from an image on a CRT display device, which comprises:

video recording means for recording and reproducing a number of figure images in sequence, said figure images being produced by means of a TV camera;

memory means for storing personal data corresponding to each of said figure images which are entered therein with the aid of a computer;

means for retrieving said personal data as video signals from said memory means and said figure images as video signals from said video recording means as a composite of said retreved video signals;

means for displaying said composite video signals as a visible composite image on a screen of said CRT display device; and

means for producing a latent image of said visible composite image displayed on said screen of said CRT display device on a printing paper and then processing said printing paper, thereby providing a print of said composite image.

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**4,712,910**

## EXPOSURE METHOD AND APPARATUS FOR SEMICONDUCTOR FABRICATION EQUIPMENT

**Keiichiro Sakato, Kawasaki, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan**

**Continuation of Ser. No. 688,599, Jan. 3, 1985, abandoned. This application Oct. 29, 1986, Ser. No. 925,487**

**Claims priority, application Japan, Jan. 5, 1984, 59-487; Jan. 9, 1984, 59-763**

**Int. Cl.[4] G03B** *27/72, 27/42*

**U.S. Cl. 355—53** **21 Claims**

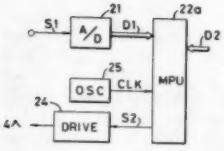
1. An exposure apparatus used in fabrication of semiconductor devices to control a mercury-vapor lamp for projecting light onto a substrate to be exposed, said apparatus comprising:

(a) supply means for supplying power to said mercury-vapor lamp whereby said lamp projects light of an intensity corresponding to the power supplied thereto by said supply means;

(b) drive means for driving said supply means; and

(c) control means for controlling said drive means to cause said supply means to supply a first power and a second power lower than said first power to said lamp, said control means controlling said drive means in such a manner that an average power supplied to said lamp over a whole exposure cycle, including an exposure period in which said first power is supplied to said lamp and an interval between exposure periods in which said second power is supplied to said lamp, attains a predetermined value, said predetermined value being not less than a rated input

power and being less than a maximum allowable instantaneous input power and said second power being not less than a minimum instantaneous input power, wherein said




control means includes means for computing said second power in dependence on a ratio between said exposure period and said interval and said first power.

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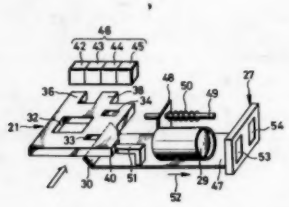
**4,712,911**

## EXPOSURE MASK FOR MICRO CAMERA

**Hisatsugu Torii, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jul. 3, 1986, Ser. No. 881,970**
**Claims priority, application Japan, Jul. 3, 1985, 60-146384**
**Int. Cl.[4] G03B *27/58***
**U.S. Cl. 355—74** **4 Claims**



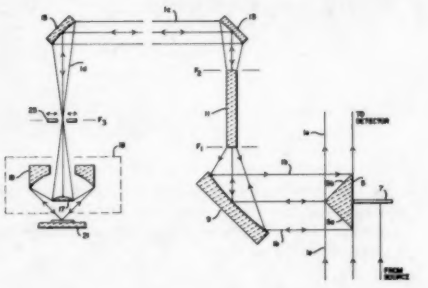

1. An exposure mask adapted to be interchangeably used with a micro camera whose microfilming format is changeable, said exposure mask having an exposure aperture for defining the size of frames of micro images to be recorded on a photographic film and at least one aperture outside the exposure aperture and which is adapted to allow data images to be projected there through to be recorded on said photographic film outside said frames, said mask having means containing mask-type information adapted to be detected by said micro camera in order to effect the changing of the microfilming format of said micro camera in accordance with the type of said exposure mask, said information-containing means comprising a plurality of opaque segments adapted to be detected by means of a photoelectric sensor in said micro camera, the arrangement of said opaque segments being unique to one type of exposure mask.

**4,712,912**

## SPECTROPHOTOMETRIC IMAGE SCRAMBLER FOR FULL APERTURE MICROSPECTROSCOPY

**Robert G. Messerschmidt, Westport, Conn., assignor to Spectra-Tech, Inc., Stamford, Conn.**

**Filed Mar. 10, 1986, Ser. No. 837,672**
**Int. Cl.[4] G01N *21/55, 21/59***
**U.S. Cl. 356—73** **25 Claims**



1. An optical system for a spectrophotometer that has a source of a beam of radiant energy and a detector for the radiant energy, said optical system directing radiant energy from the source to a sample along an optical path, comprising:

means for scrambling the beam of radiant energy from the source said scrambling means being positioned to scramble a segment of the radiant energy from the source;

means for forming a sample image with the scrambled radiant energy from the source;

means for collecting radiant energy reflected from the sample, said radiant energy having image information about the sample;

said means for scrambling being positioned to also scramble said reflected radiant energy to destroy said sample image; and

means for directing said scrambled reflected radiant energy to the detector.

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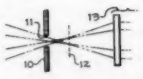
**4,712,913**

## LINEAR-SCANNED-ARRAY WAVEFRONT SENSOR

**Noah Bareket, San Jose, Calif., assignor to Lockheed Missles & Space Company, Inc., Sunnyvale, Calif.**

**Continuation of Ser. No. 522,678, Aug. 12, 1983, abandoned.**
**This application Nov. 28, 1986, Ser. No. 935,900**
**Int. Cl.[4] G01B *11/26***
**U.S. Cl. 356—121** **11 Claims**




1. An apparatus for sensing aberrations in an optical beam wavefront, said apparatus comprising:

(a) means for producing a plurality of sample beams, each sample beam having a wavefront representing a corresponding portion of the optical beam wavefront in which said aberra-

tions are to be sensed, and for converging said sample beams to form corresponding focussed sample beam spots;

(b) beamsplitting means for dividing each of said sample beams into a first component and a second component, and for directing the first compnents of said sample beams along a first path to form corresponding first-component spots on a focal surface in said first path, and for directing the second components of said sample beams along a second path to form corresponding second-component spots on a focal surface in said second path, the first-component and second-component spots thereby formed from each sample beam having a predetermined width, each first-component and second-component spot having an irradiance that is characteristic of the corresponding portion of the optical beam wavefront that is represented by the sample beam from which said first-component and second-component spots are formed;

(c) means for performing a one-dimensional integration across substantially the entire width of each of said first-component and second-component spots, the irradiance integration for each first-component and second-component spot being performed independently along a first integration axis and a second integration axis;

(d) a first linear array of time-integrating photodetectors positioned in said first path generally orthogonally with respect to said first integration axis, and a second linear array of time-integrating photodetectors positioned in said second path generally orthogonally with respect to said second integration axis, the photodetectors of said first linear array generating signals responsive to the integrated irradiance of said first-component spots, and the photodetectors of said second linear array generating signals responsive to the integrated irradiance of said second-component spots; and

(e) means for processing said signals, and for calculating a measure of position for each sample beam from said signals.

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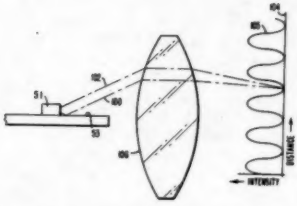
**4,712,914**

**DEVICE FOR CHARACTERIZING WIDE ANGLE BEAMS**

**Michael A. Cross, Severna Park, and Edward W. Nichols, Reisterstown, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jan. 10, 1986, Ser. No. 817,705**
**Int. Cl.[4] G01J *1/00***
**U.S. Cl. 356—121** **6 Claims**



1. A system for determining the characteristics of an optical beam comprising, in combination:

(a) optical projection means for collecting optical energy comprising a divergent optical beam and for projecting energy comprising said optical beam into a planar projection plane such that a substantially linear relationship is maintained between the energy density of said optical beam when measured in equal solid angular increments at a constant distance from the centroid of said optical beam and the energy density in said projection plane;

(b) sensor means for determining the energy density of said optical beam at predetermined location in said projection plane to generate a data matrix having a predetermined relationship to the characteristics of said optical beam;

(c) data processing means for processing said data matrix to determine selected characteristics of said optical beam; and

(d) a reflecting plane positioned between a source generating said optical beam and said optical projection means such that Lloyd's fringes are produced in said projection plane.

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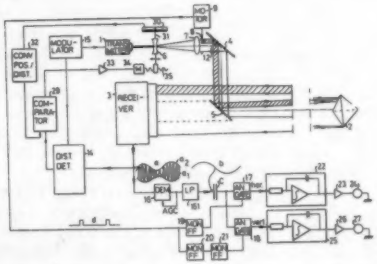
**4,712,915**

**ARRANGEMENT FOR HOLDING AN INSTRUMENT IN ALIGNMENT WITH A MOVING REFLECTOR**

**Alex S. Kosakowski, and Mats A. Lundqvist, both of Täby, Sweden, assignors to Geotronics AB, Danderyd, Sweden**

**Filed May 7, 1985, Ser. No. 731,410**
**Claims priority, application Sweden, May 21, 1984, 8402723**
**Int. Cl.[4] G01B *11/26*; G01C *1/00, 3/08***
**U.S. Cl. 356—152** **11 Claims**



1. An instrument which is adapted to be maintained in alignment with a reflector, such as a cube corner prism, which moves in relation to the instrument, said instrument comprising:

(a) transmitter means for transmitting towards said reflector for reflection thereby an electromagnetic beam of radiation which is substantially collimated or slightly divergent;

(b) receiver means for receiving the beam of radiation reflected by said reflector and for producing a corresponding output;

(c) an optical modulating means, disposed in the path of the beam of radiation transmitted by said transmitter means, for varying, at a predetermined frequency, the light intensity in at least the peripheral portion of the beam in a cyclically varying manner around the optical axis of the transmitted radiation beam so as to provide modulation of at least the peripheral portion of said transmitted beam;

(d) an electrical circuit, connected to said receiver means to receive the output therefrom, for processing at least the part of the output produced by said receiver means corresponding to the modulated peripheral portion of the transmitted beam and for producing an output signal in accordance therewith, and

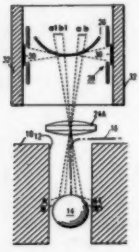
(e) servo means, connected to said transmitter means and responsive to the output signal produced by said electrical circuit, for displacing the direction of said transmitted beam in a sense such as to reduce said output signal to a minimum.

4,712,916

## APPARATUS FOR INSPECTION OF THE WALLS OF DEEP HOLES OF MINUTE DIAMETER

John B. Gunn, Mt. Kisco, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 28, 1985, Ser. No. 695,509
Int. Cl.[4] G01N *21/88*; G02B *23/24*
U.S. Cl. 356—241 1 Claim



1. Apparatus for the inspection of the walls of a deep hole of minute diameter in a structure such as an integrated circuit board comprising a reflective optical sphere having a diameter at least slightly smaller than the hole diameter, a single coated optical fiber having a diameter substantially less than the diameter of said sphere and having one end attached to said sphere for manipulation of said sphere in the hole, an optical scattering means interposed between said sphere and said fiber to disperse illumination from the optic fiber to illuminate the walls of the hole, a source of illumination at the opposite end of said optic fiber, and an optical system positioned axially at the end of said hole to pick up the image of the illuminated walls reflected from said sphere, said optical system including at least one lens and a second spherical reflector arranged beyond said lens for reflecting images focused through said lens from said first-mentioned sphere radially outwardly, a cylindrical slip aperture positioned to transmit a selected axial length of the illuminated image of the cylindrical wall being inspected as reflected from said second spherical reflector, a photographic film arranged in a cylindrical configuration in axial alignment with the hole to be inspected, and means for synchronously moving said film along an extension of the axis of said hole in synchronism with movement of said image axially within said hole to thereby generate a photographic record of the appearance of the inside wall of the hole.

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4,712,917

## READOUT FOR A RING LASER GYRO

James W. Bergstrom, New Brighton, and Theodore J. Podgorski, Maplewood, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 26, 1984, Ser. No. 665,414
The portion of the term of this patent subsequent to Apr. 15, 2003, has been disclaimed.
Int. Cl.[4] G01C *19/64*
U.S. Cl. 356—350 4 Claims

1. A readout optical apparatus for a ring laser angular rate sensor comprising:

an optically transparent substrate member having first and second major surfaces, and said second major surface includes a first beam splitter means; and

a first prism element having

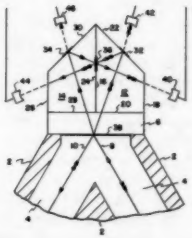
a first surface perpendicular to a second surface thereof,

a third surface being at a predetermined acute angle with respect to said first surface,

a first beam reflecting means on said third surface for reflecting, back into said first prism element and toward said first surface thereof, beams entering through said second surface, passing uninterrupted through said first prism element between said second and third surfaces, and impinging on said first beam reflecting means, and said first surface including a metallic coating thereon to provide a second beam splitter means;

a second prism element having

a first perpendicular to a second surface thereof, said first surface of said first prism element being positioned in contiguous juxtaposition with respect to said first surface of said second prism element, said second surface of said first prism element being coplanar with said second surface of said second prism element, said first and second prism elements being bonded together at said first surface solely by optical bonding, and said coplanar second surfaces of said first and second prism



elements being positioned in contiguous juxtaposition with said first major surface of said substrate member, and bonded thereto solely by optical bonding with said second beam splitter means being in the interface between said contiguous first surfaces of said first and second prism elements; and

a third surface being at said predetermined acute angle with respect to said first surface, said third surface including a second beam reflecting means for reflecting back into said second prism element toward said first surface thereof, beams entering through said second surface of said second prism element passing through said second prism element between said second and third surfaces thereof, and impinging on said second beam reflecting means.

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4,712,918

## METHOD FOR MEASURING INK DENSITY

Helmut Weigend, Leipzig; Bernd Morgenstern, Lützschena, and Peter Reinhardt, Leipzig, all of German Democratic Rep., assignors to Veb Kombinat Polygraph "Werner Lambertz" Leipzig, Leipzig, German Democratic Rep.

Filed Nov. 14, 1984, Ser. No. 671,629
Claims priority, application German Democratic Rep., Nov. 14, 1983, 256652
Int. Cl.[4] G01N *21/86*
U.S. Cl. 356—429 3 Claims

1. In a method for measuring ink density on printed sheets in an operating printing machine by means of a measuring head, a light source which illuminates measuring marks provided on a printed material, a sensor, which receives reflected light from said marks and measures a value of the reflected light and converts said value of said light into electric signals, and an electric circuit receiving signals from said sensor, the improvement comprising:

releasing a start of a measuring process by controlling electrical impulse flanks of said signals,

wherein measuring of said light reflected from a measuring mark is performed by sensors having short response time; and

determining a medium reflection of an entire surface of a measuring mark being scanned,

wherein said controlling of electrical impulse franks of said signals is released via a leading edge of at least one printed measuring mark and the light source responds via a con-

trol switching circuit whereas a rear edge of said measuring mark effects a brief interrogation of a value measured by the sensors by means of a detecting and holding switching circuit; and wherein the reflected light is measured by photodiodes and said controlling is switched in circuit with the photodiodes and the light source, while, during the monitoring of the mark, a changed voltage occurs on the inputs of the photodiodes, which is amplified by an alternating current amplifier and a peak value of the amplified voltage is stored, and when a leading edge of the measuring mark is available near the photodiodes the latter and the light source are switched off.

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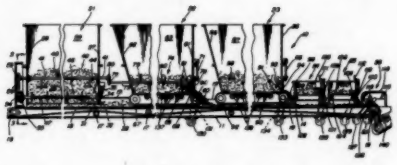
**4,712,919**

## CONTINUOUS SOIL MIXING APPARATUS

**Floyd E. Bouldin, McMinnville, Tenn., assignor to Bouldin & Lawson, Inc., McMinnville, Tenn.**

**Filed Jan. 6, 1987, Ser. No. 670**
**Int. Cl.[4] B01F *15/00***
**U.S. Cl. 366—133** **14 Claims**



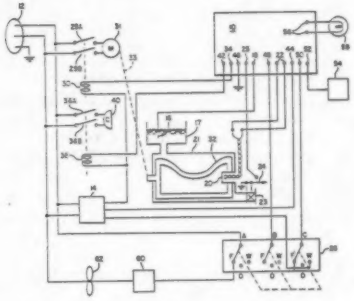
1. A continuous soil mixing apparatus comprising:
(a) an elongated, endless conveyor belt having an elongated upper run for carrying soil deposited on said upper run,
(b) conveyor drive means for driving said conveyor belt continuously in a longitudinal direction,
(c) an elongated first hopper having upper and bottom portions and opposite end walls, and adapted to receive a first soil of predetermined composition,
(d) an elongated second hopper having upper and bottom portions and opposite end walls, and adapted to receive a second soil of a composition different from said first soil,
(e) support means mounting said first and second hoppers longitudinally spaced above the upper run of said conveyor belt, said second hopper being downstream from said first hopper,
(f) said first hopper having an open bottom spaced directly above and proximate to said upper run, so that first soil received in said first hopper gravitates directly upon said upper run below said first hopper,
(g) agitator means in said first hopper for breaking up said first soil in said first hopper,
(h) an elongated, endless feed belt extending the length of the bottom portion of said second hopper for supporting the second soil received in said second hopper,
(i) feed drive means for driving said feed belt to move second soil on said feed belt toward the downstream end of said second hopper,
(j) a discharge opening in said second hopper at the downstream end of said feed belt through which said second soil is discharged from said second hopper by said feed belt upon the upper run of said conveyor belt and upon any of said first soil carried by said upper run,
(k) a mixing chamber above said upper run downstream from said second hopper,
(l) a rotary mixer device in said mixing chamber, and
(m) mixer drive means for actuating said mixer device to continuously mix said layers of said first soil and said second soil carried on said upper run of said conveyor belt into said mixing chamber.

**4,712,920**

## APPARATUS FOR MANUFACTURING SOFT ICE CREAM AND THE LIKE

**Theodore Ames, Portland, and Vernon E. Brown, Jr., Yamhill, both of Oreg., assignors to Glacier Products, Inc., Portland, Oreg.**

**Continuation-in-part of Ser. No. 637,382, Aug. 2, 1984, Pat. No. 4,551,025. This application Aug. 26, 1985, Ser. No. 769,664**
**Int. Cl.[4] A23G *9/00***
**U.S. Cl. 366—144** **21 Claims**



1. In a controller means for operating an apparatus for manufacturing soft ice cream and the like, said soft ice cream being served with a desired characteristic, said controller means responsive to the actuation, for incremental serving periods, of a dispenser spigot, the improvement comprising:
said controller means having preset therein a base period and having:
1. means for accumulating said incremental serving periods during said base period, and comparing said accumulated incremental serving periods to said base period; and
2. means for maintaining said desired characteristic as said accumulated incremental serving periods vary during successive base periods.

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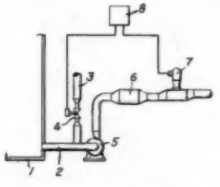
**4,712,921**

## MIXER FOR CONTINUOUSLY MIXING FLUIDS

**Hikoroku Sugiura, 1-1569-1 Minami, Kaijin-cho, Funabashi-shi, Chiba-ken, Japan**

**Filed Oct. 24, 1986, Ser. No. 924,343**
**Int. Cl.[4] B01F *5/04***
**U.S. Cl. 366—151** **3 Claims**




1. A mixer for continuously mixing fluids adapted to be employed in conjunction with a paper-making line comprising a slurry tank, a material supply pipe extending from said slurry tank and including a pump, a dilution water injecting pipe connected to said supply pipe upstream of said pump, a concentration determination device connected to said supply pipe downstream of said pump and a control board operatively connected to said concentration determination device, characterized in that said mixer is mounted in said material supply pipe between said pump and said concentration determination

device and comprises a hollow cylindrical body including an enlarged diameter central portion, an inwardly tapering inlet port provided at one end of said body and connected to said supply pipe and an outlet port of uniform diameter provided at the other end of said body; and an impinging disc disposed vertically within said enlarged diameter central portion and having the diameter greater than the minimum diameter of said inlet port and smaller than the diameter of said enlarged diameter central portion of the body, said impinging disc having a projection at the periphery of the disc extending towards said inlet port so as to define an annular clearance between the inner surface of said enlarged diameter central portion and the periphery of said disc.

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**4,712,922**

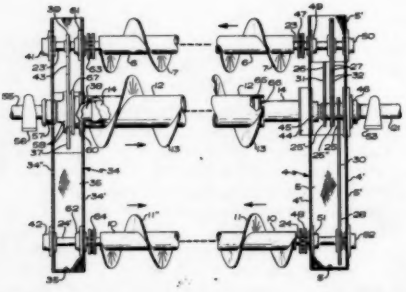
## MATERIAL MIXING APPARATUS

**Leon G. Feterl, Salem, S. Dak., assignor to Core Industries Inc., Bloomfield, Mich.**

**Filed Jan. 3, 1986, Ser. No. 815,928**

**Int. Cl.[4] B01F** *7/08, 7/14, 15/02;* **B65G** *33/26*

**U.S. Cl. 366—288** **35 Claims**



1. A material mixing apparatus for a mixer box, comprising:

an elongated center shaft rotatively driven about a longitudinal axis within said mixer box;

a first rotor end assembly fixedly mounted transversely to one end of said center shaft for rotation therewith, said first rotor end assembly being hollow and comprising a plurality of hollow arms extending radially therefrom;

a second rotor end assembly fixedly mounted transversely to the opposite end of said center shaft for rotation therewith, said second rotor end assembly including a plurality of hollow arms extending radially therefrom corresponding in number to said plurality of hollow arms of said first rotor end assembly;

a plurality of outer augers extending longitudinally within said mixer box, parallel to and radially spaced from said center shaft, each said outer auger comprising an elongated outer auger shaft having a helical flight means fixedly mounted on a portion thereof to move said material longitudinally, said outer auger shafts having one end rotatably mounted in the terminal portion of a hollow arm of said first rotor end assembly and the opposite end rotatably mounted in the terminal portion of the corresponding arm of said second rotor end assembly;

a high speed drive shaft rotatably mounted within and projecting from said first rotor end assembly;

outer auger drive means enclosed within said first rotor end assembly for transmitting rotational energy from said high speed drive shaft to said outer auger shafts to rotate said outer augers with respect to said mixer box;

a low speed drive shaft fixedly mounted to said second rotor end assembly and coaxial with said center shaft for rotation of said first and second rotor end assemblies in unison, together with said plurality of outer augers mounted thereon, in an orbit about said center shaft; and

bearing means attached to said mixer box for supporting said high speed drive shaft and said low speed drive shaft within said mixer box.

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**4,712,923**

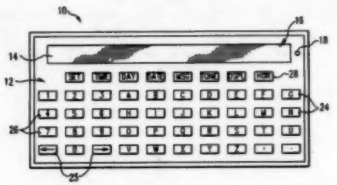
## ELECTRONIC CALENDAR AND METHOD FOR RANDOMLY SELECTING AND DISPLAYING MESSAGES

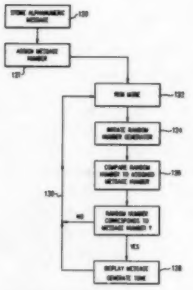
**Victor G. Martin, 513 Willowcrest Dr., Garland, (Dallas), Tex. 75040**

**Filed Jun. 23, 1986, Ser. No. 877,471**

**Int. Cl.[4] G04B** *47/00, 19/24, 45/00*

**U.S. Cl. 368—10** **17 Claims**





1. An electronic calendar, comprising:

a keyboard having function keys and alphanumeric keys for entering time, date, and message data;

means connected to said keyboard for storing and processing said time, date, and message data;

display means connected to said keyboard and said storing and processing means for displaying said time, date, and message data; and

said storing and processing means including means for randomly selecting designated message data for display at recurring times.

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**4,712,924**

## WATCH FOR DISPLAYING A LINE ON THE DIAL

**Fabrizio Agostini, Florence, Italy, assignor to Trast Enterprise S.r.l., Florence, Italy**

**Filed May 20, 1986, Ser. No. 864,992**

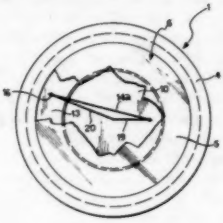
**Claims priority, application Italy, May 20, 1985, 67462 A/85; May 5, 1986, 53359/86[U]**

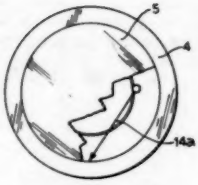
**Int. Cl.[4] G04B** *19/04*

**U.S. Cl. 368—76** **12 Claims**

1. A clock comprising a clock casing, a dial, time indicator means associated with the dial, and means for controlling the

indicator means, wherein the indicator means is comprised of a single straight line on the dial, the ends of the line pointing





towards two separate zones of the periphery of the dial corresponding to the time to be indicated.

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**4,712,925**

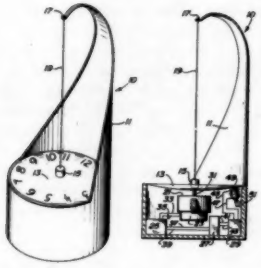
## PENDULUM TYPE DECORATIVE AND TIME INDICATING DEVICE

**William B. Beebe, 2832 Main St., Bethlehem, Pa. 18017**

**Filed Jan. 27, 1987, Ser. No. 7,725**

**Int. Cl.[4] G04B *17/02***

**U.S. Cl. 368—179** **18 Claims**



**1.** A time keeping device comprising:

(a) an at least partially upwardly facing surface structure,

(b) time indicia means associated with said partially upwardly facing surface,

(c) pendulum means arranged for oscillation over the portion of the time indicia means indicating actual time during such oscillation,

(d) electromagnetic means positioned adjacent to said time indicia in position to maintain oscillation of said pendulum across the time indicia means,

(e) intermittent energization means for energizing the electromagnetic means,

(f) timing means for controlling the intermittent energization of said intermittent energization means to the portion of the oscillation of the pendulum approaching the electromagnetic means.

**4,712,926**

## ELECTRONIC TIMEPIECE

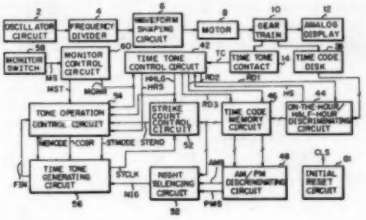
**Tohru Tanabe, Showa, Japan, assignor to Rhythm Watch Company Limited, Tokyo, Japan**

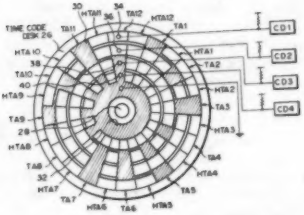
**Filed Jun. 25, 1986, Ser. No. 878,411**

**Claims priority, application Japan, Jun. 29, 1985, 60-141587; Jun. 29, 1985, 60-98374[U]**

**Int. Cl.[4] G04C *21/16***

**U.S. Cl. 368—251** **9 Claims**




**1.** An electronic timepiece including a time tone contact for providing a start signal, a time code disk including time code patterns composed of radially extending time areas formed by dividing a surface into at least twelve areas, said time areas having electrically conductive portions and non-conductive portions which are disposed in a diametrical direction therein to provide time codes of on-the-hour times corresponding to a time indication made by time indicating hands, time tone circuit means for starting a time tone generating operation in response to said start signal and a clock strike count control circuit which receives a code signal from said time code disk as a signal for limiting the number of time tone strikes, for terminating the time tone operation when the code value and the number of time tones strikes generated coincide, comprising:

a control circuit for generating read-in signals in response to said start signal; and

memory circuit means for storing said time code from said time code disk in response to said read-in signals;

wherein said time code being stored in said memory circuit means is supplied to said clock strike count control as the signal for limiting the number of time tone strikes.

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**4,712,927**

## NESTED PLASTIC EXTENSION SLIDE

**Robert Arrendiell, and Gwendolyn E. Ellis, both of 280 Sugarberry Cir., Houston, Tex. 77024**

**Filed Mar. 16, 1987, Ser. No. 26,150**

**Int. Cl.[4] F16C *29/02***

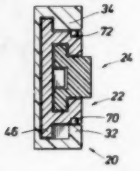
**U.S. Cl. 384—23** **11 Claims**

**1.** A nested plastic extension slide for mounting a drawer into an accommodating opening in an apparatus, comprising

an outer piece having a "C" shaped vertical cross section, the vertical base thereof being suited for installation on an inside wall of a drawer opening of the apparatus, the open

side of the "C" ending in an upturned lower branch and in a downturned upper branch,

a center piece having a "C" shaped vertical cross section facing in the same direction as the "C" shaped cross section of said outer piece, the open side of the "C" having a downturned upper branch and an upturned lower branch, said vertical base of the "C" of said center piece having an upward vertical flange extending behind said downturned upper branch of the "C" shaped cross section of said outer piece and a downward vertical flange extending behind said upturned lower branch of the "C" shaped cross section of said outer piece, the lower branch of the "C" shaped cross section of said center piece being vertically




supported by the top edge of the upturned lower branch of the "C" shaped cross section of said outer piece, and

an inner piece having a base extending behind the downturned upper branch and upturned lower branch of the "C" shaped cross section of said center piece and having a center portion vertically supported by the top edge of the upturned lower branch of the "C" shaped cross section of said center piece, said center portion of said inner piece being suited for mounting to the outside surface of the vertical side wall of the drawer,

whereby the vertical load of the drawer is supported by the respective upturned lower branches of the "C" shaped outer piece and center piece.

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**4,712,928**

## RING FASTENER FOR MACHINE PARTS

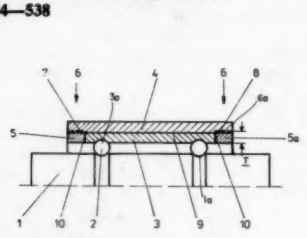
**Manfred Brandenstein, Eussenheim, Fed. Rep. of Germany, assignor to SKF Kugallagerfabriken, Schweinfurt, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 583,379, Feb. 24, 1984, abandoned. This application Aug. 11, 1986, Ser. No. 895,426**

**Claims priority, application Fed. Rep. of Germany, Mar. 31, 1983, 8309591[U]**

**Int. Cl.[4] F16C** *35/00*

**U.S. Cl. 384—538** **3 Claims**




1. The combination comprising a machine element, a tubular member and a ring fastener mounting the machine element in the circular bore of the tubular member, said ring fastener being in the form of a split annular ring member having a width, an axis, a lateral surface of saw tooth profile in cross section, a predetermined radial thickness and diametrically confronting end faces, the ring member being of a diameter slightly greater than the diameter of said bore in the tubular member, each end face having a first axial section extending generally parallel to said axis of the ring member and a second inclined section extending at a predetermined angle to the axis of the ring member, said first and second sections of the end faces normally aligned and confronting in a relaxed condition of the ring member and displaceable axially relative to one another for insertion of the ring member in the bore of the tubular member and after seating of the ring member in the bore displaceable in an opposite axial direction by application of an axial force adjacent the axial end faces, the end faces coact and move from a partially overlapped position wherein the edge of the first surface of one end face confronts and engages the second surface of the other end face to a circumferentially aligned position resulting in the circumferential expansion of said ring such that a radially directed friction self-locking effect between said ring member and said bore is achieved.

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**4,712,929**

## LABEL PRINTER WITH VARIABLE FORMAT

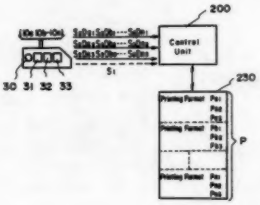
**Takashi Kitaoka, Ohtsu, Japan, assignor to Kabushiki Kaisha Ishida Koki Seisakusho, Kyoto, Japan**

**Filed Oct. 26, 1983, Ser. No. 545,474**

**Claims priority, application Japan, Oct. 27, 1982, 57-188832; Dec. 1, 1982, 57-211865**

**Int. Cl.[4] B41J** *11/44*

**U.S. Cl. 400—76** **3 Claims**




1. A journal printer for printing data received from a plurality of electronic weighers in a selected one of a plurality of different printing formats, comprising:

memory means for storing a plurality of printing formats;

weigher discrimination means for discriminating from which of the plurality of electronic weighers data is received;

mode discrimination means for discriminating whether said data is of a registration, totalizing or label printing mode, each mode having a corresponding printing format;

reading means for reading the printing format out of said memory device in accordance with the results of said discrimination performed by said weigher discrimination means and said mode discrimination means; and printing means for printing out said data in the printing format read out of said memory device.

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**4,712,930**

## GRADATION THERMAL PRINTHEAD AND GRADATION HEAT TRANSFER PRINTING APPARATUS

**Susumu Maruno, Osaka; Shinobu Nakata, Takatsuki; Michinori Nagahiro, Katano, and Seiko Minamide, Nara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Continuation of Ser. No. 729,039, Apr. 30, 1985, abandoned. This application Sep. 4, 1986, Ser. No. 903,886**

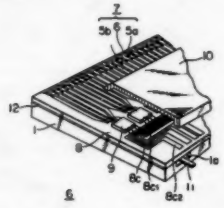
**Claims priority, application Japan, Apr. 19, 1985, 60-83750**

**Int. Cl.[4] B41J** *3/02;* **G01D** *15/10*

**U.S. Cl. 400—120** **4 Claims**

1. A gradation thermal printhead comprising a plurality of heat generating elements arranged in a line, each of said heat generating elements having a pair of electrodes and a heat generating body connected between said electrodes, said heat

generating body having an electric resistance value distribution such that the resistance value is changed in a staggered



manner at least in the direction of connection to said electrodes.

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**4,712,931**

**COLOR PRINTER INCLUDING A MULTIPLE COLOR INK RIBBON CARTRIDGE AND TENSIONING DEVICE**

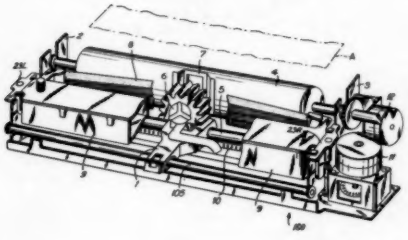
**Keiichi Ohshima, Nagano, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan**

**Filed Mar. 14, 1985, Ser. No. 711,791**

**Claims priority, application Japan, Mar. 16, 1984, 59-50745**

**Int. Cl.[4] B41J** *32/02*

**U.S. Cl. 400—196.1** **29 Claims**



**1**. A color printer comprising a frame, a carriage slidably supported on said frame; a print head supported on said carriage; a multiple-color ink ribbon having bands of color; storage means for containing said multiple-color ink ribbon and for guiding said multiple-color ink ribbon adjacent said print head; color selection means for moving said storage means relative to said print head to select a band of color for printing; a ribbon mask positioned to oppose said print head for guiding said multiple-color ink ribbon relative to said print head; and advancing means for reciprocating said carriage proximate a current carriage position a distance sufficient to displace said multiple-color ink ribbon in said storage means to tension said multiple-color ink ribbon after a color band has been selected by the color selection means and before printing.

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**4,712,932**

**RIBBON GUIDE DEVICE**

**Toshiki Morita, Toyoake, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan**

**Continuation of Ser. No. 693,808, Jan. 23, 1985, abandoned. This application Jul. 14, 1986, Ser. No. 883,433**

**Claims priority, application Japan, Jan. 28, 1984, 59-10869[U]; Jan. 28, 1984, 59-10870[U]**

**Int. Cl.[4] B41J** *32/02*

**U.S. Cl. 400—208.1** **9 Claims**

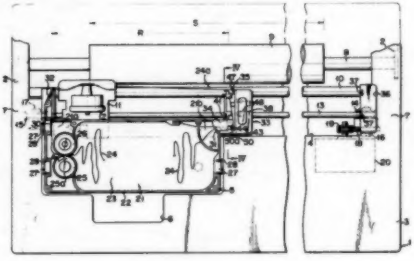
**1**. A ribbon guide used in a printing machine which comprises a platen, a printing head capable of reciprocating along a printing line on the platen and defining a predetermined traveling stroke, a supporting frame for supporting the platen and the printing head, and a cover member for covering a top surface of the printing machine, said ribbon guide comprising:

ribbon supply means containing a ribbon mounted on the cover member, said supply means having a pair of ribbon apertures which are formed at two respective adjacent corner portions toward the platen, said ribbon being partially exposed from the ribbon supply means through the ribbon aperture;

said cover member having a pair of side portions and a notch portion therebetween thereby allowing the printing head to move throughout the traveling stroke thereof, and a holding recess communicating with the notch portion and adapted to removably hold the ribbon supply means therein, each of said side portions being disposed at a respective side of said notch portion;

first ribbon guide arm means provided on the ribbon supply means so as to face one of the ribbon apertures and extend from one of said corner portions toward the platen thereby to movably support the ribbon portion exposed through said one ribbon aperture;

second ribbon guide arm means detachably mounted on the other of said corner portions of the ribbon supply means so as to face the other ribbon aperture to movably support



the ribbon portion exposed through said other ribbon aperture, whereby the exposed ribbon portion is stretched between the first and second ribbon guide arm means and is conditioned to exert a tension in a horizontal direction on the second ribbon guide arm means;

said second ribbon guide arm means having a top surface thereon and being freed from the cover member when detached from the ribbon supply means; and

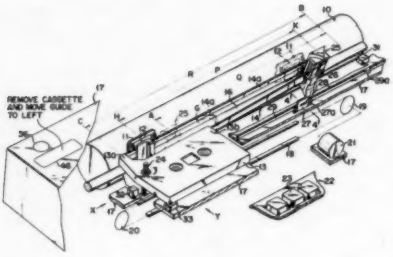
mounting means adapted to detachably mount the second ribbon guide arm means, when detached from the ribbon supply means, to said one side portion of the cover member in an attachment position along a direction perpendicular to the plane of the cover member at right angles to the horizontal direction of the ribbon tension, said mounting means including a vertically extending stud member formed on one of said cover side portions and the second ribbon guide arm means, and a vertically extending groove member formed on the other of said cover side portions and the second ribbon guide arm means to slidingly and mating engage with said vertically extending stud member along the direction of said mutual vertical extension thereby positively holding the second ribbon guide arm means in the attachment position against the ribbon tension.

4,712,933

## RIBBON GUIDE DEVICE INCLUDING A SEPARATE, LONGITUDINALLY SHIFTABLE, RIBBON GUIDE MEMBER

Yukihito Natsume, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Continuation of Ser. No. 739,379, May 30, 1985, abandoned.
This application Dec. 10, 1986, Ser. No. 940,177
Claims priority, application Japan, Jun. 1, 1984, 59-82243[U]
Int. Cl.[4] B41J *35/04*
U.S. Cl. 400—248 11 Claims




1. A printer comprising:
a platen;
printing means movable relative to the platen along a print line on the platen;
ribbon supply means containing a print ribbon and disposed in a predetermined fixed position, said print ribbon including a looped ribbon portion exposed from the ribbon supply means to the outside;
a ribbon guide member movable along the print line between a first position and a second position, said ribbon guide member capable of being located within a region surrounded by the exposed looped ribbon portion when in the first position and to be releasably latched when in the second position;
moving means capable of actuating the ribbon guide member for movement between the first and second positions; and
a control device including
first sensing means for detecting the location of the ribbon guide member in the first position,
second sensing means for detecting the location of the ribbon guide member in the second position,
a control means for actuating, in cooperation with the first sensing means, the moving means so that the moving means urges the ribbon guide member in the first position to move toward the second position, thereby causing the ribbon guide member to engage the looped ribbon portion so that the ribbon is drawn out from the ribbon supply means, and
said control means stopping, in cooperation with the second sensing means, the operation of the moving means when the ribbon guide member reaches the second position, thereby causing the ribbon to be stretched along the print line between the ribbon supply means and the ribbon guide member.

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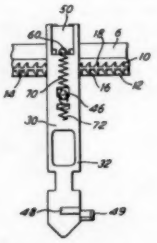
4,712,934

## TYPEWRITER CARRIAGE ESCAPEMENT MECHANISM HAVING TWO SETS OF TEETH

Peter Greaves, Nottingham, England, assignor to Dobson Park Industries plc, Nottingham, United Kingdom

Filed Nov. 26, 1985, Ser. No. 802,031
Claims priority, application United Kingdom, Nov. 28, 1984, 8430084
Int. Cl.[4] B41J *19/48*
U.S. Cl. 400—332.5 5 Claims

1. A typewriter having a carriage and driving means biasing the carriage to move in one direction, and a carriage escapement mechanism comprising:
(a) A rack movable with the carriage, said rack having first and second sets of teeth projecting away from one another on opposite sides of the rack;
(b) An escapement member constrained to slide in a straight line at right angles to the direction of movement of the rack, and movable between first and second positions;
(c) Said escapement member having a tooth arranged to engage the first set of teeth on said rack when said member is in its second position, said tooth moving out of engagement with the rack as said member is moved to its first position;
(d) A pawl slidably mounted in said escapement member for movement relative to said member in a straight line at right angles to the direction of movement of said rack, between first and second positions;
(e) Resilient means biasing said pawl to its first position relative to said escapement member;
(f) Said pawl having a tooth arranged, when said pawl is in its first position and said escapement member is in its first position, to engage the second set of teeth on said rack;



(g) The tooth on said escapement member and the tooth on said pawl, when the pawl is its first position, being spaced apart from one another by a distance, measured in the direction of movement of said member, less than the distance, measured in the same direction, between the crests of the teeth of the first and second sets of teeth of said rack;
(h) The tooth of said escapement member and the tooth of said pawl being so positioned relative to said rack, in the direction of movement of said rack, that movement of said escapement member from its first to its second position allows said rack to move through a first predetermined distance and movement of said escapement member from its second to its first position allows said rack to move through a second prdetermined distance; and
(i) Movement of said pawl to its second position relative to said escapement member when said escapement member is in its first position being arranged to withdraw the tooth on said pawl from said rack to allow said rack to move freely.

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4,712,935

## BLANK DOCUMENT GUARD IN A CHECK WRITING MACHINE

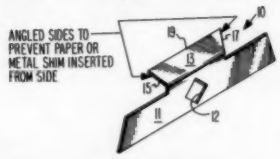
Philip G. LaDue, and James D. Peglow, both of Canandaigua, N.Y., assignors to The Standard Register Company, Dayton, Ohio

Filed Nov. 4, 1985, Ser. No. 794,985
Int. Cl.[4] B41J *13/10*
U.S. Cl. 400—645.1 9 Claims

1. A guard for use in a printer to inhibit the entry through a document aperture in said printer of extraneous print receiving media between an ink ribbon and a printer platen, said ink ribbon and said printer platen being positioned beneath said document aperture, comprising,
support means adapted to be disposed on an ink ribbon

containing cartridge and defining a ribbon aperture through which said ink ribbon may be driven,

pressure means extending from said support means to said




platen above said ribbon and adapted to bear against said printer platen along a line directly above said ribbon aperture, thereby closing the space between said ink ribbon and said printer platen.

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**4,712,936**

## ONE-PIECE CAP AND BRUSH AND METHOD OF FORMING IT

**Milton Kessler, 6690 Harrington Ave., Youngstown, Ohio 44512**

**Continuation-in-part of Ser. No. 277,843, Jun. 26, 1981, abandoned. This application Mar. 23, 1983, Ser. No. 478,051**

**Int. Cl.[4] A46B** *11/00*

**U.S. Cl. 401—129** **12 Claims**

**1.** A method of forming a one-piece internally threaded cap and brush structure for closing a container and for spreading liquid content of the container, comprising the steps of:

(a) providng a mold having at least three relatively movable mold parts which cooperate to define a cavity configured to form a one-piece cap, stem and brush structure which includes:

(i) a top wall;

(ii) a skirt depending from the top wall and formed integrally therewith, the skirt having threads formed on its inner surface;

(iii) an elongated stem depending from central portions of the top wall along a central axis of the mold cavity and formed integrally with the top wall;

(iv) a brush formed of discrete bristles depending from the stem and formed integrally therewith; and wherein said mold includes a cavity for forming said elongate stem with a plurality of discrete bristle projections integrally extending axially therefrom;

(b) injecting molten plastics material into the mold cavity to form the cap and brush structure;

(c) removing the cap and brush structure from the mold cavity by effecting relative movement of the three mold parts, with two of the mold parts separating to open the mold cavity to permit removal of the cap and brush structure from the mold cavity, and with a third of the mold parts moving in a direction paralleling the central axis to engage the cap and brush structure and to pop the threaded shirt off such one of the other two mold parts as formed the threaded inner surface of the skirt; and

(d) elongating the plurality of discrete bristle projections to diminish their cross-sections, the elongation being effected after the cap and brush structure is removed from the mold cavity.

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**4,712,937**

## PLOTTER STYLUS WITH CAP COVERED VENT

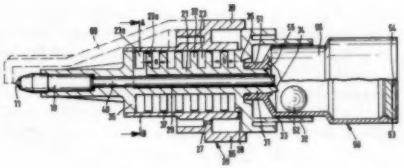
**Rolf Schmidt, St. Georgen, and Roland Schneider, Tennenbronn, both of Fed. Rep. of Germany, assignors to Schmidt Feintechnik GmbH, Fed. Rep. of Germany**

**Filed Apr. 9, 1985, Ser. No. 721,466**

**Claims priority, application Fed. Rep. of Germany, Apr. 28, 1984, 3415859**

**Int. Cl.[4] B43K** *9/00, 7/00*

**U.S. Cl. 401—213** **1 Claim**



**1.** An elongated cylindrical plotter pen comprising a liquid ink distribution means at its distal end, a cap adapted and constructed to cover said distribution means, a liquid ink reservoir means at its proximal end, a cylindrical housing means having an inner cylindrical wall positioned between said ink distribution means and said ink reservoir means, an ink duct means positioned centrally and coaxially in said cylindrical housing means adapted and constructed to capillary convey ink from said ink reservoir means to said ink distribution means, a cylindrical hollow core means positioned internally and coaxially of said cylindrical housing means and about said ink duct means at a capillary producing distance, said core means having a plurality of radially outwardly extending fins defining annular spaces therebetween each having outwardly facing peripheral portions, said peripheral portions of said fins being spaced from the inner cylindrical wall of said cylindrical housing means for a capillary producing distance, said fins and said spaces each define an axial dimension of about the same distance, means for fluidly connecting said ink duct means and the annular space closest to said ink distribution means, relatively large means for fluidly connecting each of said annular spaces in said core means, said cylindrical housing means having a separate annular chamber annularly about said core means and remote therefrom, a first vent means for fluidly connecting the annular space closest to the ink reservoir means through said cylindrical housing means to said annular chamber, said annular chamber having a second vent means for fluidly connecting the annular chamber to the ambient atmosphere only when said cap is removed from said plotter pen.

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**4,712,938**

## EXPANSION SEAL ASSEMBLY

**Venkatraman Seshamani, Gillette, and Dudley P. Money, Parsippany, both of N.J., assignors to Foster Wheeler Energy Corporation, Livingston, N.J.**

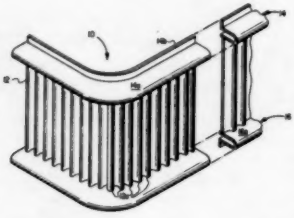
**Filed Jan. 13, 1986, Ser. No. 818,468**

**Int. Cl.[4] E02D** *29/12*

**U.S. Cl. 403—24** **3 Claims**

**1.** An expansion seal assembly for sealingly connecting two vertically spaced members subject to differential thermal expansion and contraction, said assembly comprising a corru-

gated plate extending between the two members with its corrugations extending vertically to accommodate differential thermal expansion and contraction between the two members in at least one lateral direction, a first U-shaped expansion joint rigidly secured at its respective ends to the upper edge of said plate and to one of said members, and a second U-shaped expansion joint rigidly secured at its respective ends to the



lower edge of said plate and to the other of said members, the ends of each of said expansion joints being movable relative to each other in a vertical direction to accommodate differential thermal expansion and contraction between said two members in an axial direction, and being movable relative to each other in a lateral direction to accommodate said thermal expansion and contraction between said members in said lateral direction.

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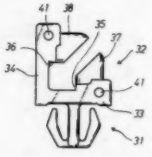
**4,712,939**

**SUBSTRATE SUPPORT OF INTEGRAL CONSTRUCTION**

**Nobuaki Fujimoto, Okazaki, Japan, assignor to Kitagawa Industries Co., Ltd., Nagoya, Japan**

**Filed Dec. 31, 1985, Ser. No. 815,024**
**Claims priority, application Japan, Jan. 11, 1985, 60-2610[U]**
**Int. Cl.[4] F16B *5/06*; H05K *7/12***
**U.S. Cl. 403—24** **19 Claims**



1. A substrate support of integral construction by which a substrate (20, 39) can be fixed angularly relative to a plate (22, 40), said substrate support comprising:

(a) a first base (3, 3', 33);

(b) a fixing portion (1, 31) for coupling said first base (3, 3', 33) to a plate (22, 40);

(c) a first projection (7, 37) extending from said first base (3, 3', 33);

(d) a wall (9, 34) extending from said first base (3, 3', 33) at least generally parallel to said first projection (7, 37); and

(e) a second projection (8, 38) extending from said wall (9, 34) toward said first projection (7, 37) but leaving a space therebetween, said second projection (8, 38) being integral with said wall (9, 34) and said first projection (3, 37) and said second projection (8, 38) having the same form and having slopes facing each other,

whereby, in use, a substrate (20, 39) is gripped by said first base (3, 3', 33), said first projection (7, 37), and said second projection (8, 38) so that an end of the substrate (20, 39) can be inserted into the space between said first projection (7, 37) and said second projection (8, 38) and the substrate (20, 39) can be fixed angularly relative to a plate (22, 40).

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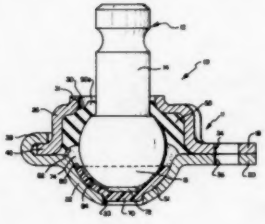
**4,712,940**

**JOINT ASSEMBLY**

**Ruey E. Wood, Jr., St. Clair Shores, Mich., assignor to TRW Inc., Cleveland, Ohio**

**Continuation of Ser. No. 726,135, Apr. 23, 1985, abandoned.**
**This application Jan. 2, 1986, Ser. No. 815,675**
**Int. Cl.[4] F16C *3/00***
**U.S. Cl. 403—133** **9 Claims**



1. A ball and socket joint for use between load bearing members which pivot relative to each other,

said ball and socket joint including a ball stud for connection with one member and a socket for connection with the other member,

said ball stud including a ball portion and a shank portion projecting from said ball portion,

said socket having a chamber in which said ball portion is located and an opening through which said shank portion projects,

a cup-shaped polymeric bearing liner interposed between a first part of said ball portion and said socket for transmitting forces and enabling sliding movement to occur therebetween, and

an elastomeric layer bonded to a second part of said ball portion and resiliently interconnecting said ball stud and socket and urging said ball stud and socket to an initial relative position,

said elastomeric layer having portions which project into volumes defined by said socket to mechanically interlock said elastomeric layer and socket and prevent slipping of said elastomeric layer relative to said socket.

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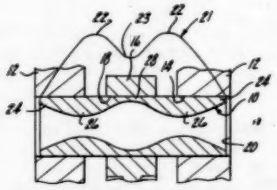
**4,712,941**

**TAPERED PISTON PIN**

**Eric D. Emmer, Troy, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.**

**Division of Ser. No. 808,968, Dec. 16, 1985. This application Dec. 3, 1986, Ser. No. 937,243**
**Int. Cl.[4] F16C *11/06***
**U.S. Cl. 403—151** **1 Claim**



1. A tubular piston pin for an internal combustion engine with a double hourglass configured aperture extending axially therethrough produced by relatively thin-walled end portions and midportion and by relatively thicker-walled portions therebetween, comprising:

a piston pin having a cylindrical exterior surface on which bending load and shear load forces are imposed by portions of an associated piston and a connecting rod whereas

the bending and shear forces are greatest at two locations on either side of the midportion and inwardly from either end;

a contoured aperture extending axially through the pin characterized by relatively thin walled end portions and midportion and by relatively thicker-walled portions therebetween whereby the thicker-walled portions are substantially aligned with the increased bending and shear force load on the pin in the areas on either side of the contact between the pin and the associated connecting rod;

the tubular piston pin being composed of two joined half pin portions which are axially aligned and integrally weld joined together.

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**4,712,942**

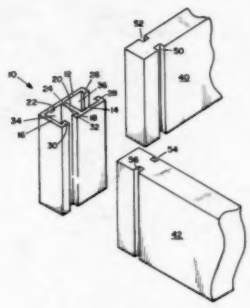
## JOINT MAKER

**Robert K. Brown, 416 S. Church St., Lockhart, Tex. 78644**

**Filed Sep. 22, 1986, Ser. No. 909,580**

**Int. Cl.[4] F16D *1/00*; F16B *1/00***

**U.S. Cl. 403—174** **7 Claims**



1. Joint maker for joining at least two pieces of stock, each piece of stock with opposing configured like grooves comprising:

a. at least two opposing angled inwardly extending cleat means, each of said cleat means including an expanding section which angles inwardly;

b. arm means supporting each of said cleats; and,

c. at least one interconnecting member means supporting and connecting said arm means for a captured area between said arm means and said interconnecting member means, each of said cleat means diverges inwardly toward said interconnecting member means providing for engagement within opposing grooves of said stock.

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**4,712,943**

## METHOD AND MACHINE FOR LEVELLING CONCRETE WHEN CASTING LARGE CONCRETE AREAS

**Yngve Alvarsson, Skogshemsvägen 7B, S-141 41 Huddinge, Sweden**

**PCT No. PCT/SE85/00162, § 371 Date Nov. 29, 1985, § 102(e) Date Nov. 29, 1985, PCT Pub. No. WO85/04686, PCT Pub. Date Oct. 24, 1985**

**PCT Filed Apr. 4, 1985, Ser. No. 824,691**

**Claims priority, application Sweden, Apr. 9, 1984, 8401977**

**Int. Cl.[4] E01C *19/29, 21/00***

**U.S. Cl. 404—75** **9 Claims**

1 A method for levelling and smoothing concrete when concreting large areas, characterized by providing a machine the bottom surface of which comprises a rotatable endless belt, providing sealing flanges along the longitudinally extending edges of said belt to prevent concrete from flowing over the surface of said belt opposite the surface thereof in contact with the concrete to thereby enable flotation of said machine on said concrete, floating said machine even on a highly fluid concrete mass which thus normally exerts very low surface pressure onto the substratum such that the machine is supported solely by the concrete, moving the machine over, while it floats on, the surface of the concrete to level and smooth the concrete as a result of the rolling motion between the surface of the concrete and the belt arranged on the machine and in contact with said concrete surface.

6. A machine for levelling and smoothing concrete when concreting large areas, the machine being arranged to be

moved over and in direct contact with the surface of the concrete and being supported solely by said concrete, characterized in that the bottom surface of the machine intended for contact with the concrete comprises an endless belt (3) which extends over two rotatable drums (1, 2), said belt being adapted to level and smooth the concrete during movement of the machine over the surface thereof as a result of rolling motion between the belt and the concrete surface and in that the belt (3) is provided along its longitudinally extending edges with sealing flanges (13–15) which flanges sealingly co-act with side portions (4) of the machine, whereby the machine floats even on highly fluid concrete mass.

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**4,712,944**

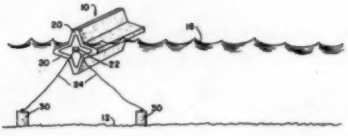
## SEA WAVE DISSIPATOR APPARATUS AND METHOD FOR ITS MANUFACTURE

**Leo J. Rose, 16 S. Pendleton Ct., Frederick, Md. 21701**

**Continuation of Ser. No. 334,514, Dec. 30, 1981. This application Oct. 29, 1986, Ser. No. 924,575**

**Int. Cl.[4] E02B *3/06***

**U.S. Cl. 405—26** **8 Claims**



1. Improved sea wave dissipator systems comprising

a plurality of floatable buoyant members constructed of a rigid material,

each of the members having a generally star shaped geometric outer sectional configuration being symmetrically disposed about a vertical plane with a portion forming a substantially horizontal portion thereof disposed for engagingly receiving an oncoming sea wave form front,

end elements constructed integrally with the members and having a central coupling unit mounted proximate a horizontal axis of the members,

an integral component of the members having an integrally depending ballast portion defined as a generally hollow interior configuration and disposed below a surface of sea waves,

each of the members having the generally star shaped geometric outer sectional configuration related to the generally hollow interior configuration as is the outer sectional configuration,

the central coupling units being axially rotatable about the horizontal axis of the members,

anchor means positioned on each side of the vertical plane

and deposited on the sea floor for retaining the buoyant members in a generally stationary relative position when the buoyant members are disposed in a floating relation,

line members extending between the central coupling units and the anchor means,

a plurality of distally arranged air and water fluid check valves disposed and mounted in the end elements and adapted to be adjusted to selectively pass or retain fluid within the members,

the members, when it is desired to raise them from a bottom and lowered position in water, then being coupled by a series of air supply lines for augmenting the air supply within the plurality of members, and

lines and unidirectional flow check valve means being provided for remotely supplying of pressurized air fluid to the members.

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**4,712,945**

## SYSTEM FOR SEALING BARRIER CONSTRUCTIONS IN SUBTERRANEAN GALLERIES

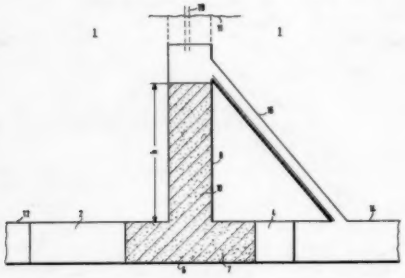
**Christian Schrimpf, Hildesheim, Fed. Rep. of Germany, assignor to Leine & Konig, Fed. Rep. of Germany**

**Filed Jul. 23, 1985, Ser. No. 758,214**

**Claims priority, application Fed. Rep. of Germany, Jul. 28, 1984, 3427978**

**Int. Cl.[4] E21D *9/14*; E21F *17/00***

**U.S. Cl. 405—132** **31 Claims**



3. A device for sealing a barrier construction in a subterranean gallery, said gallery including a stressing medium that applies pressure within the gallery and a hollow space, comprising, in combination:

a fluid sealing medium substantially filling said hollow space and maintained at an overpressure relative to the pressure of the stressing medium, said fluid sealing medium positioned between a part of the gallery to be protected and another part of the gallery in which the stressing medium stands;

a pressure shaft interconnected to said hollow space, said fluid sealing medium standing at a predetermined level within said pressure shaft and an upper portion of said pressure shaft located above the level of the fluid sealing medium; and

an interconnection between said upper portion of said pressure shaft and said part of said gallery holding said stressing medium.

**4,712,946**

## ASSEMBLY AND INSTALLATION OF PIPES

**Cyril B. Greatorex, Stapleford; Ian W. H. Smith, Allestree, and Graham J. Hammersley, Awsworth, all of England, assignors to Stanton plc, Ilkeston, England**

**Filed Feb. 24, 1986, Ser. No. 831,823**

**Claims priority, application United Kingdom, Mar. 1, 1985, 8505315**

**Int. Cl.[4] F16L *1/00***

**U.S. Cl. 405—170** **15 Claims**

1. A method of assembling and installing pipes comprising disposing at least one cable between a first station and a second station; attaching a first pipe to the cable at or adjacent one of said stations: moving the pipe away from said one station with the cable; jointing a second pipe to the first pipe and attaching the second pipe to the cable at or adjacent said one station; repeating the jointing and attaching operation to provide an elongate connected sequence of pipes attached to the cable; and drawing the cable away from said one station towards the second station to move the sequence of pipes into its desired position between the first and second stations, the attachment of the pipes to the cable being such as to hold the pipe jointings together when the cable is drawn from one station towards the second station.

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**4,712,947**

## MINE SUPPORT PROP

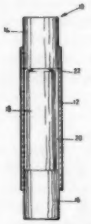
**Michael J. Thom, Krugersdorp, South Africa, assignor to Hunt Leuchars and Hepburn Limited, South Africa**

**Filed Jul. 20, 1981, Ser. No. 284,727**

**Claims priority, application South Africa, Jul. 22, 1980, 80/4405**

**Int. Cl.[4] E21D *15/02*; E04G *25/02***

**U.S. Cl. 405—288** **4 Claims**

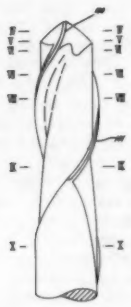


1. A mine support prop comprising a timber load support member which is elongated in the direction of its grain and yieldable in its lengthwise direction, and which includes a zone of reduced cross-sectional area that is no less than 40% of the cross-sectional area of the non-reduced portion of the timer member and a sleeve which surrounds and supports the timber member over and on either side of its zone of reduced cross-section, with the sleeve being out of contact with the timber member in its zone of reduced cross-sectional area to define a void between said sleeve and said zone, said sleeve being constructed of ductile mild steel adapted yieldably to restrain an increase in the cross-sectional dimension of the timber member as the prop is reduced in length under load.

## 4,712,948
## BALL END MILL CUTTER

Morio Kidani, Kopo Tasaka 304, 8-14, Misasamachi 2-chome, Nishi-ku, Hiroshima-shi, Hiroshima-ken 730, Japan

Continuation-in-part of Ser. No. 717,752, Mar. 29, 1985, abandoned. This application Jul. 15, 1986, Ser. No. 886,307
Claims priority, application Japan, Mar. 31, 1984, 59-64217
Int. Cl.[4] B23C *5/02, 5/10*
U.S. Cl. 407—42 3 Claims



1. A ball end mill cutter comprising a central axis and a mill body and a shank portion distributed along said central axis, said mill body comprising a generally cylindrical surface and a reference semi-spherical surface mounted on a tip end of said reference cylindrical surface and a plurality of helical cutting edges continuously provided between said cylindrical surface and the reference semi-spherical surface, a random point of said cutting edges on said reference semi-spherical surface being expressed as:

when a reference latitudinal plane is taken as a junction surface of the reference cylindrical surface with the reference semi-spherical surface;

a plane corresponding to a meridian plane with respect to the reference semi-spherical surface is taken as a reference longitudinal plane intersecting with the reference latitudinal plane;

an angle between the reference latitudinal plane and a radius line of the sphere drawn to the reference semi-spherical surface (which radius line extends from a central point at which the reference latitudinal plane intersects with the central axis of the ball end mill cutter) is taken as a latitudinal angle $\alpha$;

an angle of a line tangent to a said helical cutting edge with respect to the reference longitudinal plane (which tangential line passes through a point at the intersection of the cutting edge line of the cutting edge with the reference latitudinal plane) is taken as a helical angle $\gamma$;

an angle of a longitudinal plane (namely the longitudinal plane connecting the central axis of the ball end mill cutter to a random point of the tip of helical cutting edge on the reference semi-spherical surface) with respect to the reference longitudinal plane is taken as a helical cutting edge longitudinal angle $\beta$;

a random value of a latitudinal angle $\alpha$ in the range of 65° to 90° is taken as $\alpha p$;

a function producing a desired smooth line with respect to the latitudinal angle is taken as $F(\alpha)$; and

a differential of the function $F(\alpha)$ is taken as $F'(\alpha)$; then in the range of $0 \leqq \alpha \leqq \alpha p$

$$\beta = \tan \gamma \cdot F(\alpha)$$

$F'(0)=1$

$F'(\alpha p)=0$ or a positive value approaching 0,

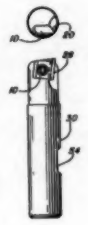
and in the range of $\alpha p \leqq \alpha < 90°$

$F'(\alpha)=0$ or a positive value approaching 0.

## 4,712,949
## ON-EDGE END-MILLING INSERT

William B. Johnson, Rockford, Ill., assignor to Ingersoll Cutting Tool Company, Rockford, Ill.

Continuation-in-part of Ser. No. 842,460, Mar. 21, 1986, abandoned. This application Feb. 4, 1987, Ser. No. 10,761
Int. Cl.[4] B26D *1/00*
U.S. Cl. 407—42 11 Claims



1. An on-edge cutting insert for end mills or the like comprising an essentially flat block of cutting material having

two opposed major surfaces at least one of which is a plane surface constituting a major locating surface upon which the insert is seated in a tool body while the other major surface provides a radially outward facing secondary clearance surface when the insert is so seated,

a plane minor boundary edge face disposed at an obtuse angle to said major locating surface and constituting the rake face of the insert,

an opposite, plane, minor boundary edge face perpendicular to the major locating surface and constituting a first locating edge surface,

an adjoining minor boundary edge face disposed perpendicularly to said major locating surface and to said opposite minor boundary edge face and constituting a second locating edge surface,

a fourth minor boundary edge face opposed to said second locating edge surface and disposed at an obtuse angle to said opposite minor boundary edge face and intersecting said rake face at an acute angle, and

a primary clearance face extending along an edge of said secondary clearance face adjacent to said rake face and intersecting the rake face to define a cutting edge with an acute included angle larger than the included angle between said rake and secondary clearance faces extended,

said block having a hole passing between said major surfaces to receive a fastener for securing the insert to a tool body, said hole being countersunk at said other major surface.

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## 4,712,950
## DRILLING FIXTURE AND WORK HOLDER

Robert L. Reynolds, 70 Stanley Ave., Landisville, Pa. 17538

Filed Dec. 10, 1985, Ser. No. 806,827
Int. Cl.[4] B23B *49/02*
U.S. Cl. 408—72 R 3 Claims

1. A drilling fixture and work holder comprising:

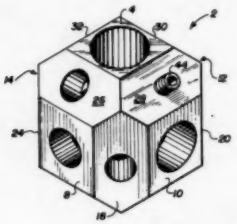
(a) at least a first one piece, uniformly square cube having six flat surfaces and all of its corners chamfered at a 45 degree angle to form twelve additional flat surfaces whereby the original six sides of the cube and the twelve chamfered corners form an eighteen sided symmetrical polygon;

(b) the eighteen flat surfaces being arranged such that each surface is paired with a surface on the opposite side of the polygon to form nine paired surfaces with the two surfaces of each pair being parallel to each other;

(c) said polygon having a center point and each flat surface having a midpoint, said eighteen flat surfaces being arranged such that the midpoint of each flat surface is spaced the same distance from the center point of the polygon and said paired flat surfaces being arranged such

that the midpoint of each flat surface of the pair of parallel surfaces and the center point of the polygon are along a single straight line;

(d) a plurality of nine or less, but more than two cylindrical bored holes of differing size diameters ranging from the largest size to the smallest size extending completely through the polygon, each bored hole extending from one surface to the parallel surface of each paired surface and



positioned concentric with the single straight line containing the midpoint of the paired parallel surfaces to provide only one bored hole per pair of parallel surfaces; and

(e) each larger size diameter bored hole normally being a means receiving and holding a rod to be drilled and each smaller size diameter bored hole perpendicular to said larger size diameter bored hole being a means receiving a drill to cross drill said rod.

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**4,712,951**

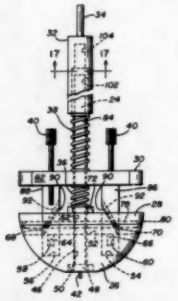
**TOOL FOR CUTTING ANNULAR GROOVE**

**Byron L. Brown, 2315 Hendrick Blvd., Fort Smith, Ark. 72903**

**Filed Aug. 26, 1985, Ser. No. 769,135**

**Int. Cl.[4] A61F *17/32*; B23B *51/00***

**U.S. Cl. 408—158** **10 Claims**



1. A tool for cutting an annular groove on the interior of an annular surface comprising:

a. a primary body having a pointed base for anchoring said cutting tool and a portion for being grasped and rotated by a power source, said portion of said primary body for being grasped and rotated by a power source comprises a handle having a first hollow portion forming means for positioning on and freely rotating about said primary body and a second hollow portion forming means for engaging said primary body wherein said body rotates with said handle, and a projection extending from the outer end of said handle for being grasped by said power source to rotate said primary body and cut said annular groove,

b. a groove cutting assembly including a cutting bit carrier attached to and extending horizontally from said primary body towards said interior surface,

c. at least one horizontal passageway in said bit carrier,

d. a cutting bit slidably positioned in said horizontal passageway, said cutting bit including a cutting tip and a base,

e. an orifice extending through said bit carrier perpendicular to and communicating with said cutting bit passageway,

f. a wedge plate slidably attached to said primary body above said groove cutting assembly,

g. a projection depending from said wedge plate and extending into said orifice in said bit carrier for movement upwardly and downwardly within said orifice,

h. a sloping wedge shaped surface on said plate projection,

i. a corresponding sloping wedge shaped surface on said base of said cutting bit for sliding attachment to said sloping wedge shaped surface on said plate projection so that said bit is moved outwardly when said projection is moved downwardly in said orifice and inwardly when said projection is moved upwardly in said orifice,

j. a channel in said plate projection parallel to and communicating with said sloping wedge shaped surface of said plate projection,

k. a mating projection on said wedge shaped sloping surface of said base of said cutting bit for insertion in said channel in said plate projection thereby slidably attaching said cutting bit to said plate projection,

l. at least one arm mounted in and extending below said wedge plate toward and above said bit carrier and contacting said bit carrier as said wedge plate is forced downwardly to prevent further movement of said wedge plate,

m. means for controlling the position of said one arm toward or away from said bit carrier thereby varying the downward travel of said wedge plate, and

n. a spring positioned about said primary body and located between said wedge plate and said bit carrier to be compressed whem said wedge plate is moved towards said bit carrier thereby causing said wedge plate to be moved away from said bit carrier and said bit withdrawn from said groove when force on said wedge plate is removed.

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**4,712,952**

**DRILL FOR GENERATING OF HOLES IN A WORK PIECE**

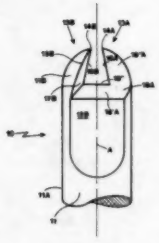
**Karl B. Isaksson, and Bror G. K. Svahn, both of Sandviken, Sweden, assignors to Santrade Limited, Luzern, Switzerland**

**Filed Mar. 4, 1986, Ser. No. 835,944**

**Claims priority, application Sweden, Mar. 7, 1985, 8501106**

**Int. Cl.[4] B23B *51/00***

**U.S. Cl. 408—211** **7 Claims**



1. A drill for generating a hole in a workpiece comprised of a composite material, said drill comprising a shank rotatable about a longitudinal axis and including a cylindrical envelope surface and a longitudinally forward cutting end defined by a pair of cutting portions arranged symmetrically about said longitudinal axis, each said cutting portion comprising:

a front surface defining a chip surface and facing in a first direction having a component extending in the direction of rotation, said front surface being raked in a positive fashion such that said first direction has another component extending longitudinally rearwardly,

a curvalinear outer surface defining a longitudinally forward extension of said envelope surface, and

an end surface facing in a direction having a component extending longitudinally forwardly and another component extending away from the direction of rotation,

said front, outer, and end surfaces intersecting to form a cutting point which defines a longitudinally forwardmost point and a radially outermost point of the respective cutting portion,

said front and outer surfaces intersecting at an acute angle to form an outer circumferential cutting edge extending longitudinally rearwardly from said cutting end point, said outer circumferential cutting edge forming a first acute angle with said axis as viewed in a radial direction,

said front and end surfaces intersecting to form an inner cutting edge extending longitudinally rearwardly from said cutting end point and forming a second acute angle relative to an imaginary line which intersects both of said cutting end points as viewed in a longitudinal direction, a longitudinally innermost end of said inner cutting edge being spaced radially outwardly of said axis and radially inwardly of said outer surface,

each of said inner cutting edges extending nonradially as viewed in said longitudinal direction, with a longitudinally rearward end of each of said inner cutting edges disposed circumferentially rearwardly of said imaginary line with reference to said direction of rotation as viewed in said longitudinal direction.

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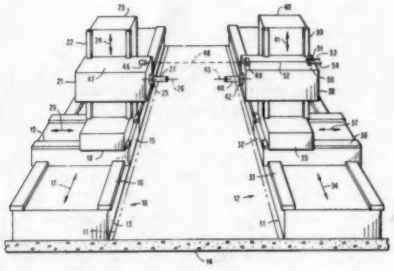
**4,712,953**

## METHOD AND APPARATUS FOR ALIGNING CUTTING TOOLS

**John R. Witzel, Goshen, and Paul J. Weisgerber, Cincinnati, both of Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio**

**Filed Feb. 19, 1987, Ser. No. 16,414**
**Int. Cl.[4] B23B *39/06*; B23Q *15/24***
**U.S. Cl. 409—131** **20 Claims**



1. A method of forming aligned bore holes in opposite side walls of a part by two separate cutting tools mounted in two separate spindle carriers adjacent the opposite side walls of the part including:

positioning one of the two separate cutting tools on one of the two separate spindle carriers at a position at which it is to form a bore hole in one of the opposite side walls so that the longitudinal axis of the one cutting tool is aligned with the location of the center of the bore hole to be formed in the one side wall;

positioning the other of the two separate spindle carriers having the other of the two separate cutting tools at a position adjacent a zero point at which light producing means on a first of the two separate spindle carriers is aligned with light target means on a second of the two separate spindle carriers along an axis parallel to the longitudinal axes of the one cutting tool and the other cutting tool;

moving the other spindle carrier in one direction along a first axis perpendicular to the longitudinal axes of the one cutting tool and the other cutting tool from the position adjacent the zero point;

activating detector means that detects when the one of the light producing means and the light target means on the other spindle carrier is at a predetermined position prior to the zero point when the other spindle carrier is moving in the opposite direction along the first axis with activation of the detector means occurring when the other spindle carrier is at a selected distance past the zero point during movement of the other spindle carrier in the one direction along the first axis;

moving the other spindle carrier in the opposite direction along the first axis after the other spindle carrier has moved at least the selected distance past the zero point in the one direction along the first axis with a feed rate that will provide momentum to the other spindle carrier to cause it to stop with the one of the light producing means and the light target means on the other spindle carrier at the zero point when feeding of the other spindle carrier is stopped at the predetermined position prior to the zero point;

and stopping feeding of the other spindle carrier in the opposite direction along the first axis in response to a signal from the detector means detecting that the one of the light producing means and the light target means on the other spindle carrier is at the predetermined position prior to the zero point so that the one of the light producing means and the light target means on the other spindle carrier stops at the zero point whereby the other cutting tool has its longitudinal axis aligned with the longitudinal axis of the one cutting tool in a plane containing the first axis.

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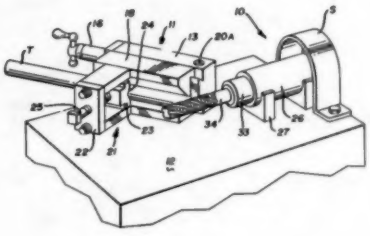
**4,712,954**

## TUBE CUTTING DEVICE

**Dino Campolito, 6949 S. Raccoon Rd., Canfield, Ohio 44406**

**Filed Sep. 5, 1986, Ser. No. 903,606**
**Int. Cl.[4] B23C *1/02***
**U.S. Cl. 409—163** **2 Claims**

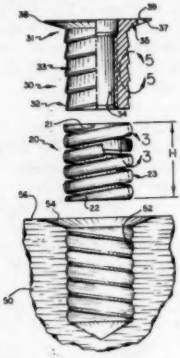


1. A tube cutting device comprises a tube holding assembly and a cutting head assembly, said tube holding assembly comprises a main body member and a movable V-block registerable thereon, having a threaded rod and follower rotatably positioned within said main body member for advancing said V-block relative said main body member, a tube clamp having movable tube engagement member comprising a U-shaped main frame member, a threaded bar threadably secured therethrough engaging a V-shaped tube engagement member positioned within said main frame member, and means for selectively pivoting said tube holder assembly, said tube cutting assembly comprises a fixed milling support and an interchangeable milling bits, drive means associated with said milling assembly and a mounting support means on which said tube holding assembly and said cutting head assembly are positioned.

## 4,712,955
## EXPANDABLE FASTENER ASSEMBLY

**Marvin P. Reece, Dana Point, and Jose Rosan, Jr., Newport Beach, both of Calif., assignors to Rexnord Inc., Brookfield, Wis.**

**Filed May 14, 1985, Ser. No. 734,416**
**Int. Cl.[4] F16B** *13/04*
**U.S. Cl. 411—17** **3 Claims**

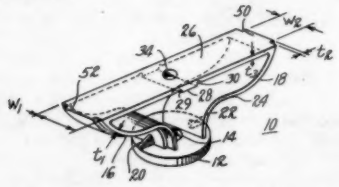


1. An expandable fastener assembly for use in a prepared opening in a parent material, said assembly comprising:
- an insert formed as a continuous, expandable, helical coil, with said coil forming an outer thread and an inner thread and having a uniform outer diameter;
- a fastener having a portion with an outer thread thereon, said fastener being constructed for threadable engagement with said insert inner thread;
- said insert outer thread constructed so as to secure said insert within an opening in a parent material when said insert is expanded thereinto; and
- means for uniformly expanding said insert and securing said fastener relative to said insert inner thread, said means including said insert inner thread having a helical surface inclined at approximately ten degrees with respect to a vertical axis, with said fastener outer thread having a like thread form for mating with said insert inner thread creating a ramp effect therebetween when a tightening torque is applied to said fastener.

## 4,712,956
## PLASTIC WALL ANCHOR

**Michael E. Bond, Topton, and Fred R. Voreh, Wyomissing, both of Pa., assignors to USM Corporation, Farmington, Conn.**

**Filed Sep. 21, 1981, Ser. No. 304,075**
**Int. Cl.[4] F16B** *13/06*
**U.S. Cl. 411—55** **12 Claims**

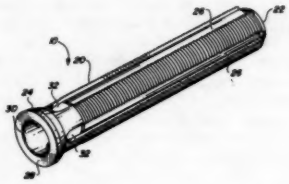


1. A plastic wall anchor which is to receive and hold a threaded fastener in a flexed state, said plastic wall anchor comprising the following when in an unflexed state prior to receipt of the threaded fastener:
- a head portion having a hole therein for receiving the threaded fastener;
- a pair of reverse curved legs extending from said head portion to either side of the hole therein; and
- a collapsible member extending between said pair of reverse curved legs and having a hole therein which is substantially in alignment with the hole in said head portion, said collapsible member having ends connected to the ends of said pair of reverse curved legs, said reverse curved legs each having a curved arc portion of definable radius below said collapsible member and immediate to one of said end connections so as to define a substantial open space between said collapsible member and the respective reverse curved leg thereby allowing said curved arc portion to flex.

## 4,712,957
## ADHESIVELY SECURED FASTENER

**Wayne Edwards, 125 Country Club Dr.; Richard V. Nation, 5610 Lenwood Cir., both of Sanford, Fla. 32771, and Keith A. Tomkins, 621 Oakmont Ave., Sorrento, Fla. 32776**

**Filed Dec. 11, 1985, Ser. No. 807,520**
**Int. Cl.[4] F16B** *39/02*
**U.S. Cl. 411—82** **3 Claims**



1. A fastener in which a fluent adhesive is introduced for fastening material, said fastener comprising:
- (a) a solid shank having a leading end and a trailing end;
- (b) at least one peripherally longitudinal channel along said shank;
- (c) a head on said trailing end of said fastener;
- (d) an axial cavity through said head defining a mouth, an axially extending sidewall and an inner end;
- (e) apertures through said sidewalls, said apertures communicating with said at least one longitudinal channel for introducing adhesive through said head and into said channel; and
- (f) at least one longitudinal flat surface extended along said shank from said trailing end to said leading end, said channel being formed in said flat surface.

## 4,712,958
## CONTROLLED EXPANSION FLUSH-HEAD RIVET DESIGN AND METHOD OF INSTALLING SAME

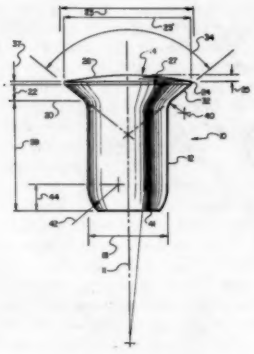
**Kenneth P. Sparling, Burbank; Angelo Incardona, Reseada; Garth D. Kikendall, Glendale; David G. Richardson, Burbank; Ronald E. Wood, Sepulveda, and Leon Bakow, Sherman Oaks, all of Calif., assignors to Lockheed Corporation, Calabasas, Calif.**

**Filed Oct. 3, 1984, Ser. No. 657,300**
**Int. Cl.[4] F16B** *19/06*
**U.S. Cl. 411—506** **4 Claims**

1. A flush-head rivet, having a shank portion with a minimum and maximum diameter and a nominal diameter therebetween, for joining two or more structural members together, the members having a countersunk rivet hole therethrough with a countersink included angle of between 99 and 101 degrees, the rivet providing controlled expansion of the rivet hole when the hole has a minimum diameter equal to the maximum shank diameter and a maximum diameter of 1.05 times the minimum shank diameter, the rivet comprising: a head portion comprising:
- a head diameter before forming a land on the edge thereof of between 1.642 times the minimum shank diameter and 1.646 times the maximum shank diameter;
- a minimum head diameter after forming the land on the edge thereof 1.596 times the minimum shank diameter;
- a land width on said head of between 0.007 times the mini-

mum shank diameter and 0.015 times the maximum shank diameter;

a head crown radius between 4.334 times the minimum shank diameter and 3.747 times the maximum shank diameter; and



a crown height of between 0.074 times the minimum shank diameter and 0.089 times the maximum shank diameter; and

an underhead included angle of 104 to 105 degrees.

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**4,712,959**

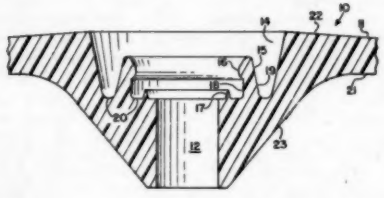
**WASHER WITH RESILIENT HEAD CRIPPING MEANS**

**Riaz Hasan, Palatine, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Continuation of Ser. No. 840,152, Mar. 17, 1986, Pat. No. 4,663,910. This application Mar. 30, 1987, Ser. No. 32,299**

**Int. Cl.[4] F16J** *15/10;* **E04D** *3/36*

**U.S. Cl. 411—533** **4 Claims**



1. A washer for use in attaching insulation to a roof member with a fastener having a head and an elongated shank, said washer comprising a resilient non-metallic body having a central throughbore, a shoulder formed in said throughbore for engaging the head of a fastener, said shoulder defining and separating upper and lower portions of said throughbore, said upper portion having a maximum lateral dimension greater than that of said lower portion, restraining means formed in said upper portion of said throughbore for engaging a portion of said fastener head, resilient head pushing means formed on said shoulder for urging the fastener head into engagement with said restraining means.

**4,712,960**

**OPENABLE CAN BODY**

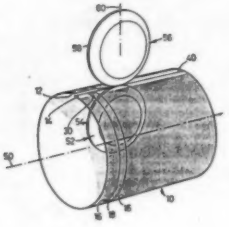
**Paul Opprecht, Bergdietikon; Werner Urech, Kaiserstuhl, and Jürg Opprecht, Widen, all of Switzerland, assignors to Elpatronic AG, Switzerland**

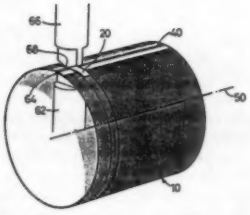
**Division of Ser. No. 754,340, Jul. 11, 1985, Pat. No. 4,637,521. This application Jul. 14, 1986, Ser. No. 885,019**

**Claims priority, application Switzerland, Jul. 12, 1984, 3404/84**

**Int. Cl.[4] B21D** *51/28*

**U.S. Cl. 413—74** **3 Claims**





1. A method of producing a can body (10) wherein a sheet-metal blank (28) provided with circumferential scorings (16) is rolled to form a cylinder and its two overlapping longitudinal edges (12, 14) are welded to one another, characterized in that a tongue (20) is placed on and welded onto the outer longitudinal edge (12) between the circumferential scorings (16) after the longitudinal edges (12, 14) have been welded to form overlapping tongue and edge welds whereby the strength of the tongue is reinforced and the weld seam between the circumferential scorings is stiffened to encourage propagation of cracks into the circumferential scorings during can opening.

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**4,712,961**

**APPRATUS FOR STACKING SHAPED MATERIALS ON A PALLET**

**Masahiro Honda, and Hironari Maeda, both of Ube, Japan, assignors to Ube Industries, Ltd., Japan**

**Filed Aug. 2, 1985, Ser. No. 761,703**

**Claims priority, application Japan, Aug. 3, 1984, 59-162842**

**Int. Cl.[4] B65G** *57/18*

**U.S. Cl. 414—42** **4 Claims**

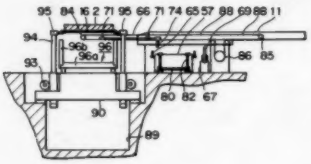
1. An apparatus for stacking elongated shapes, such as metal blocks, or the like, on a pallet and for inserting spacers between the individual adjacent shapes, comprising:

a plurality of elongated tables arranged in parallel to each other, each horizontally extending from a shape supplying station, said tables being adapted to support said shapes thereon which are supplied onto the tables one by one in a longitudinal direction of the tables which is perpendicular to a longitudinal direction of the shapes;

a spacer conveyor arranged under the tables and extending perpendicularly thereto for feeding spacers one by one from a spacer supplying machine located outside a region

occupied by the tables, said spacer conveyor including means for simultaneously stopping the spacers at a predetermined number of first positions each located between the tables and means for simultaneously lifting the spacers to second positions adjacent the tables;

a plurality of elongated transfer frames each arranged in parallel to each of the tables and supported for movement in the longitudinal direction thereof from a retracted position to a projected position wherein each transfer frame is projected to a stacking station, said transfer frames each including means for receiving each of the spacers in the second position so as to bring said spacers to the stacking station;




a plurality of conveyor belts each extending along and movably supported on each transfer frame in the longitudinal direction thereof for feeding the shapes one by one from said tables to the stacking station; and

loading means for loading a shape and a predetermined number of spacers onto the pallet at the stacking station, and repeating the same so as to make a stack comprised of several layers of the shapes, said loading means including spacer lifters having spacer holders for placing said shape and said spacers on the pallet or on the stack by slightly lifting said spacers from said receiving means of said transfer frames by means of said holders, retracting said transfer frames and then lowering said spacers on said holders.

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**4,712,962**

**ARTICULATED BOOM MECHANISM FOR UNLOADING BULK SOLID MATERIAL FROM A SHIP**

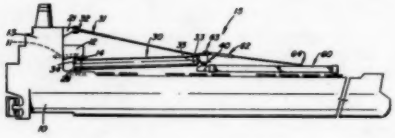
**William H. Johnston, Ville de Mont Royal, Canada, assignor to The CSL Group Inc., Montreal, Canada**

**Filed May 9, 1986, Ser. No. 861,680**

**Claims priority, application Canada, Jun. 14, 1985, 484002**

**Int. Cl.[4] B63B *27/22*; B65G *37/00***

**U.S. Cl. 414—144** **37 Claims**



1. An articulated boom mechanism for use in conveying bulk solid material, the boom mechanism comprising:

(a) a first boom construction, one end of the first boom construction being pivotally mounted to a support base by a universal-type connection, the first boom construction having a first conveyor means with one and another end extending through it for transporting material from one of its ends to another of its ends;

(b) an articulation member, one portion of which is pivotally mounted to the other end of the first boom construction;

(c) a second boom construction, one end of the second boom construction being pivotally mounted to another portion of the articulation member, the second boom construction having a second conveyor means with one and another end extending through it for transporting bulk solid material from one of its ends to another of its ends;

(d) first actuator means extending between the support base and the first boom construction for selectively varying the relative vertical angle between the first boom construction and the support base;

(e) second actuator means extending between the articulation member and the second boom construction for selectively varying the relative vertical angle between the articulation member and the second boom construction;

(f) further actuator means for maintaining the articulation member in a substantially fixed orientation relative to the support base for all angular positions assumed by the first boom construction relative to the support base;

(g) first powered pivot means for rotating the first boom construction relative to the support base through desired horizontal angles; and,

(h) second powered pivot means for rotating the other portion of the articulation member and the second boom construction mounted thereto relative to the one portion of the articulation member through desired horizontal angles whereby bulk solid material placed onto one of the conveyor means is subsequently discharged from the other conveyor means after moving through a path determined by the first and second actuator means and the first and second pivot means.

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**4,712,963**

**APPARATUS FOR SOLDERING PRINTED CIRCUIT BOARDS**

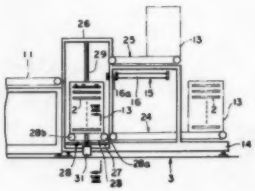
**Kenshi Kondo, Tokyo, Japan, assignor to Nihon Den-Netsu Keiki Co. Ltd., Tokyo, Japan**

**Filed Nov. 9, 1983, Ser. No. 550,092**

**Claims priority, application Japan, Jan. 18, 1983, 58-5281**

**Int. Cl.[4] B65H *5/00***

**U.S. Cl. 414—222** **5 Claims**




1. An apparatus for soldering printed circuit boards having, in combination, a transfer means for receiving printed circuit boards provided at a feed location, for transferring the circuit boards through a series of work stations, including a soldering station where each circuit board is brought into contact with molten solder, and for positioning the worked circuit boards at a delivery location, and transport means for providing at the feed location circuit boards to be soldered and for removing the worked circuit boards from the delivery location, said transport means comprising:

first and second magazines having a plurality of holding members adapted for supporting a plurality of printed circuit boards in parallel and vertically spaced apart positions, the first magazine having a plurality of circuit boards to be soldered;

first movable supporting member adapted for supporting the first magazine thereon;

first means for vertically displacing the first movable supporting memeber to successively position at the feed location respective printed circuit boards held by the holding members of the first magazine;

first operating means for moving the printed circuit board located at the feed location to displace it onto the transfer means;

first means for transporting the first magazine past the feed location, including:

a first displacing means provided on the first movable supporting member and vertically movable therewith, and operable to displace horizontally the first magazine placed thereon;

a second displacing means operable to displace horizontally the first magazine placed thereon and located at a position so that the first magazine on the second displacing means can be transferred to the first displacing means when the first movable supporting member is at a predetermied lower position;

a third displacing means operable to displace horizontally the first magazine placed thereon and located at a position so that the first magazine on the first displacing means can be transferred to the third displacing means when the first movable supporting member is at a predetermined upper position,

whereby the loaded first magazine is transferred to the first movable supporting member by the simultaneous operation of the first and second displacing means, with said first movable supporting member at said lower position, the first vertical displacing means operating to position successive circuit boards at the feed location where the first operating means displaces the board onto the transfer means, and the empty first magazine is transferred from the first movable supporting member by the simultaneous operation of the first and third displacing means, with said first movable supporting member at said upper position; and

second means for transporting the second magazine pass the delivery location, including:

a second movable supporting member adapted for supporting the second magazine thereon;

second means for vertically displacing the second supporting member to successively position respective holding members of the second magazine at the delivery location; and

second operating means for moving the worked printed circuit board located at the delivery location to displace it onto the holding member of the second magazine located at the receiving location.

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**4,712,964**

## STORAGE SYSTEM FOR PRODUCTS USING SUPPORTING UNITS

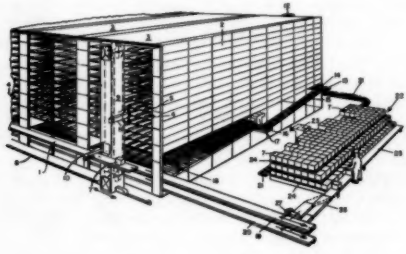
**Gerrit J. van Elten, Voorthuizen; Antonius Hurkmans, Baarn, and Hugo V. de Vries, Ermelo, all of Netherlands, assignors to Technisch Ontwikkelingsbureau van Elten B.V., Barneveld, Netherlands**

**Division of Ser. No. 769,991, Aug. 23, 1985, which is a continuation of Ser. No. 317,953, Oct. 30, 1981, abandoned. This application Aug. 26, 1985, Ser. No. 769,553**

**Claims priority, application Netherlands, Mar. 6, 1980, 8001352; Aug. 11, 1980, 8004549; PCT Int'l Appl., Mar. 6, 1981, PCT/NL81/00004**

**Int. Cl.[4] B65G *1/06, 25/02***

**U.S. Cl. 414—281** **3 Claims**



3. A storage system for products using supporting units, comprising a staging containing a number of storeys, on one side of the staging at least one supply-conveyor and at least one entry elevating device, which is movable in a longitudinal direction along the staging, as well as a device for the input of the supporting units into the staging and on the other side of the staging at least one exit elevating device, which also is movable in a longitudinal direction along the staging and at least one exit conveyor, characterized in that in each storey of the staging one or more step conveyors are mounted, which at both sides of the staging are connectable with a single driving device, which is movable vertically on the entry elevating device and the exit elevating device respectively, the driving device is movable parallel to the step conveyors in a carrying frame, which is movable up and down along the entry elevating device and the exit elevating device respectively and that one part of the driving device is connectable to a lifting beam and another part with a transport beam of the step conveyor, the driving devices consist of piston-cylinder combinations, the piston-rod of each piston-cylinder combination is connected with a gripper in which a searchopening is fitted and which is fitted with a latch disconnectable against spring force and the transport beam, the lifting beam and supporting beam of a supporting channel each are fitted with a coupling plate with an opening which by means of the latch is connectable with or disconnectable from the corresponding gripper of each piston-cylinder combination.

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**4,712,965**

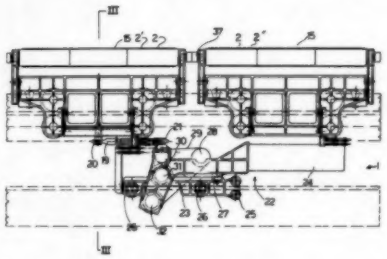
## PLANT FOR SORTING ITEMS, WITH SELF DRIVEN CARRIAGES

**Francesco Canziani, Via Contardo Ferrini 21, 21010 San Macario (Varese), Italy**

**Filed May 29, 1985, Ser. No. 738,769**

**Int. Cl.[4] B65G *67/00***

**U.S. Cl. 414—339** **7 Claims**



1. A conveyor system for use in sorting items, comprising:

a pair of uniformly-spaced side rails, each side rail having, in axial section, a substantially-vertical upright portion and a substantially-horizontal transverse portion projecting from one side of the upright portion toward the other side rail;

a central rail substantially-centrally between the side rails and lower than the side rails, the central rail having a T-shaped axial section comprising oppositely-projecting transverse webs, each transverse web having a top and a bottom and an edge opposite that of the other transverse web therebetween;

at least two carriages having coupling means for jointedly linking the carriages in tandem, each carriage comprising a freely-rotatable first wheel on one side for movement along the transverse portion of one of the side rails, two non-coaxial pairs of freely-rotatable second wheels on the other side, each pair of the second wheels engaging opposite side of the upright portion of the other of the side rails, two non-coaxial pairs of freely-rotatable third wheels engaging opposite sides of the transverse portion of the same side rail as engaged by the second wheels, belt means

comprising a rotatable belt having an uppermost run defining a conveyor plane for items to be sorted and belt-rotating means for rotating the belt with the uppermost run moving toward one of the sides of the carriage for discharging the items from the conveyor plane;

a motor unit for running along the cental rail, the motor unit comprising a frame, a pair of freelyl-rotatable wheels having horizontal axes for running on a top and a bottom of the transverse webs of the central rail, a pair of freely-rotatable reference wheels spaced from the latter for respectively acting on the tops of the transverse webs, two pair of freely-rotatable wheels having spaced vertical axes for running on the edged of the transverse webs, a motor-transmission group comprising a motor and a transmission therefor, an elastic mount oscillatorily securing the motor-transmission group to the frame with the motor on one side of the elastic mount in the direction in which the vertical axes of the two pair of wheels of the motor unit are spaced, the transmission comprising drive wheels rotated by the motor respectively acting on the bottoms of the transverse webs on the opposite side of the elastic mount from the motor, whereby the torque exerted by the weight of the motor keeps the drive wheels constantly pressed up against the transverse portions of the central rail; and

a union bar having a hinge at each end respectively connected to one of the carriages and the motor unit, whereby the one carriage is a drive carriage and the other is a driven carriage.

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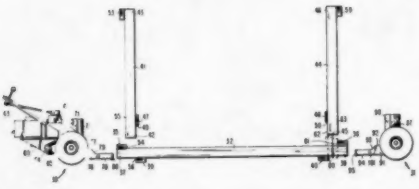
**4,712,966**

## MATERIAL HANDLING RACK WITH TRANSPORTATION MEANS

**Peter L. Gross, Indianapolis, Ind., assignor to Thomas L. Gross, Indianapolis, Ind., a part interest**

**Filed Nov. 8, 1985, Ser. No. 796,106**
**Int. Cl.[4] B60P *3/40***
**U.S. Cl. 414—458** **2 Claims**



1. A material handling rack with detachable wheels comprising:

a frame to hold material thereon and having a first end and a second end;

a first carriage having supporting wheels rotatably mounted thereon with a single horizontal axis of rotation, a first tongue movably mounted to said first carriage and insertable into said first end, a first vertical lifting means mounted to said first carriage being operable to apply an upwardly directed lifting force to lift said tongue with said first end:

a second carriage having supporting wheels rotatably mounted thereon with a sole horizontal axis of rotation, a second movable tongue movably mounted to said second carriage and insertable into said second end, a second vertical lifting means mounted to said second carriage being operable to apply an upwardly directed lifting force to lift said second tongue with said second end; and,

limit means on said frame at said first end and said second end limiting pivotal motion of said first tongue and said second tongue when inserted therein as said first vertical lifting means and said second lifting means lift said frame;

said first tongue and said second tongue are positioned and extend respectively laterally away from said single horizontal axis and said sole horizontal axis with each extending in mutually facing directions into said frame;

said limit means at said first end of said frame includes a first inner support and a first outer support vertically and horizontally spaced apart forming a first mouth;

said first tongue is insertable into said first mouth and includes a first proximate portion and a first distal portion with said first distal portion bearing downwardly against said first inner support and said first proximate portion bearing upwardly against said first outer support as said first tongue is lifted upwardly limiting pivotal motion of said first tongue;

said limit means at said second end of said frame includes a second inner support and a second outer support vertically and horizontally spaced apart forming a second mouth;

said second tongue is insertable into said second mouth and includes a second proximate portion and a second distal portion with said second distal portion bearing downwardly against said second inner support and said second proximate portion bearing upwardly against said second outer support as said second tongue is lifted upwardly limiting pivotal motion of said second tongue;

power means on said first carriage being operable to move said frame with said first carriage and said second carriage connected across ground;

said frame includes horizontally extending spaced apart members connected together and upon which material may be supported, said first outer support and said second outer support are cross members affixed to and positioned atop said horizontally extending members with said cross members including downwardly facing surfaces contactable against said first tongue and said second tongue as said frame is lifted, said first inner support and said second inner support are cross members affixed to and positioned beneath said horizontally extending members inwardly of said first outer support and said second outer support and include upwardly facing surfaces contactable against said first tongue and said second tongue as said frame is lifted, said downwardly facing surfaces are spaced apart vertically and horizontally from said upwardly facing surfaces and cooperatively therewith limit pivotal motion of said first tongue and said second tongue as said frame is lifted, said horizontally extending members with said first outer support, said second outer support, said first inner support and said second inner support cooperatively form two horizontally extending mouths opening in opposite directions to receive said first tongue and second tongue, said first carriage and said second carriage applying lifting force via said first lifting means and said second lifting means to said frame only at said first outer support and at said second outer support and contacting said frame only at said first outer support, said second outer support, said first inner support, and said second inner support;

said frame includes a first upright member removably mountable to said horizontally extending members between said first inner support and said first outer support and further includes a second upright member removably mountable to said horizontally extending members between said second inner support and said second outer support and cooperatively with said first upright member limiting movement of material resting upon said frame, said first upright member and said second upright member are vertically slidable into said mouths respectively between said first outer support and said first inner support and between said second outer support and said second inner support and extend perpendicularly therefrom, said first inner support and said first outer support have mutually facing vertical surfaces contacting said first upright member limiting movement thereof, said second inner support and said second outer support have mutually facing vertical surfaces contacting said second upright member limiting movement thereof, said first upright

member and said second upright member each have a horizontally extending stop surface contacting said horizontally extending members limiting downward movement of said first upright member and said second upright member.

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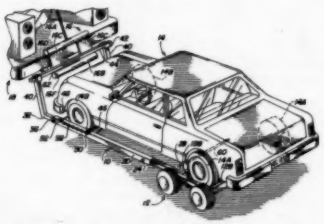
4,712,967

## CAR CARRIER ASSEMBLY

**Denis Farthing, Tampa, Fla., assignor to Gulf Eastern Manufacturing Company, Tampa, Fla.**

**Filed Nov. 26, 1984, Ser. No. 675,079**
**Int. Cl.[4] B60P 3/12**
**U.S. Cl. 414—563** **18 Claims**



1. A car carrier assembly for use in conjunction with a dolly having a means for allowing elevation of the rearward pair of wheels of a four-wheeled vehicle for towing by a lifting mechanism of a wrecker, the car carrier assembly comprising in combination:

a left and a right side member for positioning in a spaced apart manner on opposing sides of the vehicle, each said side member including a rear end and an upwardly angled front end;

a tow bar;

means for removably connecting said tow bar to said front ends of said side members for engagement by the lifting mechanism of the wrecker;

means for removably connecting said rear ends of said side members to the dolly to support said rear ends of said side members in an elevated position;

wheel engaging means for engaging the forward wheels of the vehicle; and

means for removably connecting said wheel engaging means between said side members to cause elevation of the forward portion of the vehicle upon elevation of said tow bar.

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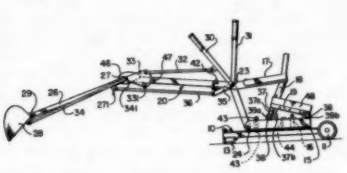
4,712,968

## MECHANICAL DIGGER TOY

**George C. Manning, P.O. Box 6001, Saskatoon, Saskatchewan, Canada S7K 4E4**

**Filed Nov. 12, 1985, Ser. No. 797,215**
**Claims priority, application Canada, Nov. 13, 1984, 467,710**
**Int. Cl.[4] E02F 3/358**
**U.S. Cl. 414—694** **9 Claims**



1. A toy mechanical digger for simulating the action of a full size hydraulic excavator comprising:

(a) a base frame member;

(b) a longitudinally-extending base beam pivotally mounted on said base frame member for manually-actuated, 360° slewing action relative to said base frame member;

(c) a seat including means for longitudinally slidably mounting said seat with respect to said longitudinally-extending base beam;

(d) a primary boom having a pivoted end, an intermediate end, ane a remote end, said pivoted end being pivotally mounted to the forward end of said base beam for pivotal movement about a first horizontal axis, such that said remote end can be raised and lowered, said intermediate end being pivotally mounted to the forward end of said seat such that forward and rearward longitudinal sliding movement of said seat is linked to lowering and raising movements, respectively, of said primary boom;

(e) a secondary boom having a pivoted end and a remote end, said pivoted end being pivotally mounted on said remote end of said primary boom for pivotal movement relative thereto about a second horizontal axis;

(f) a bucket pivotally mounted on said remote end of said secondary boom for pivotal movement relative thereto, whereby said primary boom, said secondary boom and said bucket can be manually actuated to dig and dump; and

(g) two separate, manually-actuable mechanical operators mechanically connected by linkage members and pivot means, one operator connected to said secondary boom and the other operator connected to said bucket;

whereby a user, sitting on said seat can independently and by manual operation only of said slidably mounted seat and of said two mechanical operators cause said primary boom to pivot vertically with respect to said base frame member, cause said secondary boom to pivot vertically with respect to said primary boom in a knee-like action, and cause said bucket to pivot vertically with respect to said secondary boom in an ankle-like action.

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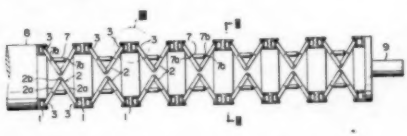
4,712,969

## EXPANDABLE AND CONTRACTABLE ARMS

**Motohiko Kimura, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Aug. 24, 1984, Ser. No. 643,793**
**Claims priority, application Japan, Aug. 29, 1983, 58-157475; Mar. 31, 1984, 59-64880**
**Int. Cl.[4] B25J 9/06**
**U.S. Cl. 414—730** **10 Claims**



1. An expandable and contractable arm comprising:

a plurality of independently expandable and contractable units; and

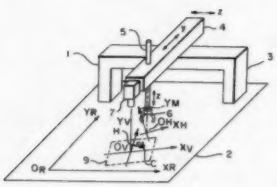
connecting means including universal joints for serially interconnecting said units into said arm;

each of said units comprising a pair of disc members disposed at opposite ends of said unit, at least three link mechanisms each comprising two links, the inner ends of said links being connected together by a pin and the outer ends of said links being connected to said pair of disc members through said universal joints and means for relatively rotating said two links about said pin independently from the other said link mechanisms within said unit thereby expanding and contracting each unit independently from another unit when said at least three link mechanisms are operated equally, and bending each unit independently from another unit when said at least three link mechanisms are operated unequally.

## 4,712,970
## METHOD FOR HANDLING A WORK IN A ROBOT SYSTEM

**Hiro Nakamura; Shuji Ohkawa; Yasuo Ohtsuka; Hajime Tachikawa, and Toshiya Shinozaki, all of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jun. 6, 1985, Ser. No. 741,949**
**Claims priority, application Japan, Jun. 8, 1984, 59-116392**
**Int. Cl.[4] B25J** *9/16, 19/04*
**U.S. Cl. 414—730** **18 Claims**



**18**. A method for handling a work in a robot system having a visual sensor capable of recognizing a centroid position of the work and an angle between a principal axis of the work and one coordinate axis of a visual field of the visual sensor, in which a robot has a hand for holidng the work and a movable arm for moving the hand, comprising the steps of:

positioning the work in the visual field of the visual sensor;

recognizing the centroid position of the work and the angle of the principal axis of the work in the visual field;

storing temporarily data representative of the centroid position of the work and the angle of the principal axis of the work in the robot system;

calculating a relation between a holding position and the centroid position of the work and a relation between a holding angle of the hand holding the work and the principal axis of the work, relative to a plane including said one coordinate axis at said holding position by using said data representative of the centroid position of the work and the angle of the principal axis of the work and other data stored in the robot system; and

holding the work at said holding position and said holding angle.

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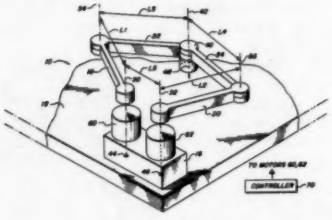
## 4,712,971
## CONTROL ARM ASSEMBLY

**Donald C. Fyler, Cambridge, Mass., assignor to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.**

**Filed Feb. 13, 1985, Ser. No. 701,151**
**Int. Cl.[4] B25J** *17/00*
**U.S. Cl. 414—744 R** **13 Claims**



**1**. A control arm apparatus for controlling the position of a control point fixedly positioned with respect to a controlled element within a reference plane with respect to a reference points in said plane, comprising:

a control arm assembly including:

A. a first link member, said first link member having a first end pivotably coupled to a support element, said first end being pivotable about a first pivot axis perpendicular to said plane and passing through a first of said reference points,

B. a second link member, said second link member having a first and pivotably coupled to a support element, said first end being pivotable about a second pivot axis perpendicular to said plane and passing through the second of said reference points,

C. a third link member, said third link member having a first end pivotably coupled to the second end of said first link member about a third pivot axis perpendicular to said plane,

D. a fourth elongated link member, said fourth link member having a first end pivotably coupled to the second end of said second link member about a fourth pivot axis perpendicular to said plane,

E. means for pivotably coupling the second end of said third link member and the second end of said fourth link members about a fifth pivot axis perpendicular to said reference plane and passing through said control point, and

F. means for coupling said controlled element to one of said third and fourth link members, and

further comprising a selectively operable control means for independently controlling the angular position of each of said first and second link members with respect to said reference axes passing through said first and second reference points.

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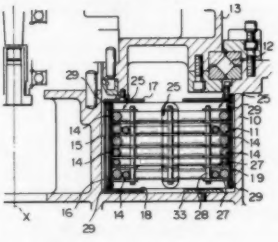
## 4,712,972
## CABLE SUPPORTING ARRANGEMENT IN INDUSTRIAL ROBOTS

**Seiichiro Nakashima; Kenichi Toyoda, both of Hino; Shigemi Inagaki, Kokubunji, and Kazuhisa Otsuka, Hino, all of Japan, assignors to Fanuc Ltd., Yamanashi, Japan**

**PCT No. PCT/JP85/00193, § 371 Date Feb. 12, 1986, § 102(e) Date Feb. 12, 1986, PCT Pub. No. WO85/04615, PCT Pub. Date Oct. 24, 1985**
**PCT Filed Apr. 12, 1985, Ser. No. 815,082**
**Claims priority, application Japan, Apr. 13, 1984, 59-73027**
**Int. Cl.[4] B25J** *11/00*
**U.S. Cl. 414—744 R** **7 Claims**



**1**. A cable supporting arrangement for use in a base body of an industrial robot with a cylindrical inner surface and a movable body mounted atop the base body pivotally about an axis of the latter, which supports inside the base body at least a cable led through the interior of the base body into the movable body, comprising:

an inner cylinder fixed to said movable body and disposed concentrically within said base body so that an annular space is defined between said inner cylinder ans said base body;

a resilient strip member having one end thereof fixed to the cylinderical inner surface of said base body and the other end fixed to the cylindrical outer face of said inner cylinder, said strip member being formed of sheet material having a substantial lateral dimension extending in the direction of said axis and having one side thereof so curved at a selected portion thereof that portions of the

strip member before and after the curved portion are facing each other, said strip member being forced under its own resilience onto the inner surface of said base body and the outer face of said inner cylinder; and

a plurality of cable holders disposed on said one side of said strip member and spaced from each other along the length of said strip member to hold said cable.

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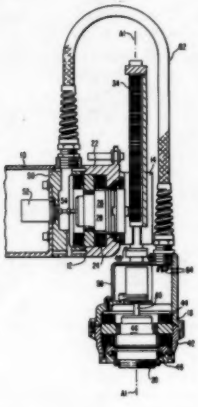
**4,712,973**

## TWO SERVO AXIS, AC POWERED ROBOT WRIST

**John Garin, Birmingham; Allan J. Riggs, Ann Arbor, both of Mich., and Robert S. Palmer, Penn Hills, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed May 15, 1986, Ser. No. 863,483**
**Int. Cl.[4] B25J *17/02***
**U.S. Cl. 414—744 A** **5 Claims**



1. A two axis wrist mounted at the end of an at least partly open-ended manipulator arm, comprising:

a substantially hollow first housing mounted to said arm end;

a first frameless permanent magnet AC motor mounted in said housing and having a rotor with its axis parallel to the axis of said arm;

an assembly mounted to the distal end of said first housing, said assembly including a bracket fixed to said housing and a carriage having opposite ends with guide means extending therebetween, said guide means being slidably received by said bracket for guiding said carriage in movement transverse to said arm axis;

said carriage including a rack gear disposed in parallel relation to said guide means and attached to at least one opposite end of said carriage, and a pinion meshing with said rack and driven by said first motor rotor to provide translational motion to said carriage;

a second substantially hollow housing having one end thereof attached to one end of said carriage and disposed with its axis transverse to said arm axis;

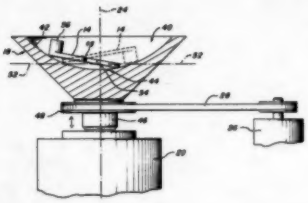
a second frameless permanent magnet motor mounted in said second housing adjacent the second housing end opposite to said second housing one end, said second motor including a stator, and a rotor providing a rotary output at said second housing opposite end to provide rotary motion of a tool at said opposite end of said second housing.

**4,712,974**

## PART POSITIONING APPARATUS AND METHOD

**Peter E. Kane, Westwood, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Jun. 24, 1985, Ser. No. 747,841**
**Int. Cl.[4] B65G *47/24***
**U.S. Cl. 414—757** **17 Claims**



12. Apparatus for positioning a piece-part in a predetermined orientation, said apparatus comprising:

a bowl-like receptacle defining an upwardly facing generally concave, curved surface disposed about a vertical axis and having a shape of a surface of revolution formed by rotating a generating curve segment about said vertical axis, and adapted to receive the piece-part thereon randomly disposed with respect to said vertical axis;

means for vibrating said receptacle to impart a sliding motion to the piece-part along said generally concave, curved surface until the center of gravity of the piece-part is disposed at its lowest-most possible position within said receptacle thereby locating said piece-part with its center of gravity in a predetermined horizontal plane and predeterminedly radially disposed with respect to said vertical axis, said curved surface making said receptacle usable with a variety of differently shaped parts; and

means for rotating said receptacle about said vertical axis to establish the desired predetermined angular orientation of the piece-part.

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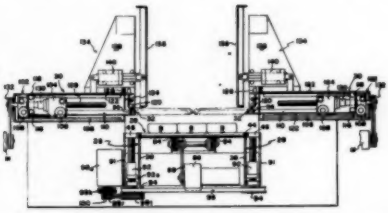
**4,712,975**

## BAG PALLETIZING SYSTEM

**Thomas R. Salts, Alpena, Mich., assignor to Besser Company, Alpena, Mich.**

**Filed Sep. 13, 1985, Ser. No. 775,731**
**Int. Cl.[4] B65G *57/30, 57/22***
**U.S. Cl. 414—786** **2 Claims**



1. A method of assembling a multi-tier stack of compressible articles such as bags of particulate material or the like having normally vertical convex perimetral side surfaces on a pallet or carrier with an elevator having an article support surface defined by a plurality of generally horizontal spaced parallel elements, movable vertically in an elevator shaft; tines, with article support surfaces thereon, projectable generally horizontally between said elements, from retracted positions out of the elevator shaft, for receiving and supporting tiers of articles transferred thereto by the elevator; and a vertically extending compression plate mechanism just above said tines movable parallel thereto from a retracted position to compress opposite sides of bags in the elevator shaft; including the steps of:

a. receiving a tier on the elevator and raising the elevator to a level to position the tier above the projection path of the tines at a time when the tines are retracted;

b. projecting the tines from a retracted position to a position below the tier and moving the compression plate mechanism from retracted position to physically compress the opposite sides of bags in the tier and displace material in the sides of the bags to flatten the convex vertical side surfaces and concave the upper surfaces of the bags without exerting a compressing force which prevents the bags from dropping under the influences of gravity;

c. lowering the elevator through the tines to transfer the tier to the tines and the elevator to a position sufficiently below the tines to receive the next tier thereon;

d. receiving the next tier on the elevator and raising the elevator to position said next tier just below the tines;

e. retracting the tines out of the shaft, while maintaining the compression plate mechanism in place, to deposit the tier formerly supported on the tines by gravity vertically on the upper surface of said next tier, and then retracting the compression plate mechanism;

f. raising the elevator to position the tiers thereon above the projection path of the tines;

g. reprojecting the tines and compression plate mechanism into the elevator shaft; and

h. lowering the elevator through the tines to transfer the tiers to the tines and the elevator to a position below the tines.

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**4,712,976**

## TANGENTIAL BLOWER

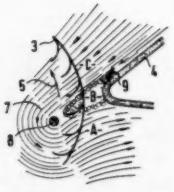
**Reinhold Hopfensperger, Dietelskirchen, and Klaus Taschner, Landshut, both of Fed. Rep. of Germany, assignors to Standard Elektrik Lorenz AG, Stuttgart, Fed. Rep. of Germany**

**Filed May 14, 1985, Ser. No. 734,345**

**Claims priority, application Fed. Rep. of Germany, May 16, 1984, 3418160**

**Int. Cl.[4] F04D** *17/04, 29/66*

**U.S. Cl. 415—54** **5 Claims**




1. A tangential blower comprising:

an impeller having blade edges extending parallel in relation to the axis of rotation,

a deflector partially surrounding said impeller,

a vortex former and side members completely or partially surrounding the impeller ends,

said vortex former in the proximity of its greatest approximation to the circumference of said impeller having on its suction side a sharp-edged interfering body non-rotatably fixed to said vortex former and extending at least over one half of the length of said vortex former, said interfering body acting to reduce noise by producing a zone of turbulence adjacent said vortex former between pressure and suction zones on either side of said vortex former through which said blade edges travel.

**4,712,977**

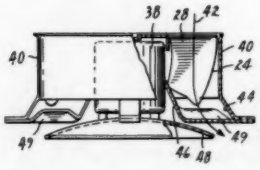
## AXIAL FAN

**Sten R. Gerfast, 1802 Valley Curve Rd., Mendota Heights, Minn. 55118**

**Division of Ser. No. 627,087, Jul. 2, 1984, Pat. No. 4,610,601. This application May 27, 1986, Ser. No. 843,038**

**Int. Cl.[4] F04D** *29/44*

**U.S. Cl. 415—209** **12 Claims**




1. Axial fan comprising

a substantially cylindrical shroud defining an axial air passage,

an impeller of n airfoil blades, n being an integer of at least 3, mounted coaxially within the shroud and rotatable to force air helically through the passage, the peripheries of the blades together generally defining a cylinder slightly smaller than the inside diameter of the shroud, the length of each blade at said cylinder being at least 20% of the distance between identical points on adjacent blades along said cylinder, and the blades having a depth-to-radius ratio exceeding 0.5, and

bell-shaped deflector means coaxially positioned to extend at least partially across the air passage at the exhaust to redirect the airflow toward radially outward directions, said deflector means comprising coaxial first and second circular deflector plates, the first plate being bell-shaped and integral with the motor housing and having a diameter which is small compared to that of the shroud at the exhaust, and the second plate being dish-shaped and downstream from the first plate, of larger diameter, and having a convex surface facing the impeller.

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**4,712,978**

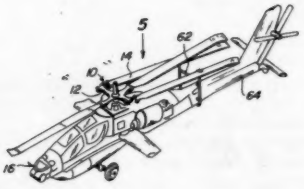
## HELICOPTER BLADE AND THE LIKE STAND-OFF AND FOLDING DEVICE

**James P. Tiemann, 100 Manor Rd., Huntington, N.Y. 11743**

**Filed Dec. 1, 1986, Ser. No. 936,708**

**Int. Cl.[4] B64C** *11/28, 27/50*

**U.S. Cl. 416—1** **6 Claims**




5. A method for folding a helicopter blade assembly, which comprises:

a. removing a first retaining pin from said helicopter blade assembly;

b. pivoting a rotor blade in a first direction about a second retaining pin;

c. inserting a stand-off and folding device between said rotor blade and a main rotor of said helicopter;

d. installing a third retaining pin through said stand-off and folding device, and said main rotor of said helicopter;

e. installing a fourth retaining pin through said stand-off and folding device, and said rotor blade of said helicopter;
f. removing said second retaining pin from said helicopter blade assembly; and
g. pivoting said rotor blade in a second direction about said third and said fourth retaining pins in said helicopter blade assembly to a folded position.

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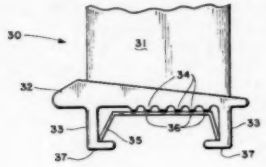
**4,712,979**

## SELF-RETAINED PLATFORM COOLING PLATE FOR TURBINE VANE

**Stephen N. Finger, Jupiter, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Nov. 13, 1985, Ser. No. 797,581**
**Int. Cl.[4] F01D 5/08**
**U.S. Cl. 416—96 R** **4 Claims**




1. A stator vane assembly, comprising;
(a) a platform having upper and lower surfaces and leading and trailing edges;
(b) a vane attached to the platform upper surface;
(c) pin fins defined on the platform lower surface;
(d) first and second wall means defined on the platform lower surface respectively near said leading and trailing edge and defining a channel between said first and second wall means;
(e) inwardly extending retaining flanges on each wall means, spaced a predetermined distance from the platform lower surface, and formed as permanently fixed in place integral extensions of said first and second wall means; and,
(f) a cooling impingement plate comprising a substantially flat sheet of resilient material having first and second downwardly slanted bent edges on opposite sides of said sheet, the sheet positioned inside said channel against said pin fins and the downwardly slanted bent edges resiliently biased against said wall means; and, whereby said impingement cooling plate can be inserted and removed only by deformation of the impingement cooling plate.

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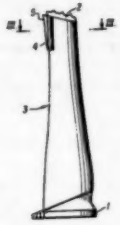
**4,712,980**

## FAIRING FOR TURBO-JET ENGINE FAN LEADING EDGE

**Jean-Marie L. Gely, Le Havre; Marins J. Goutines, Melun, and Geordes Meauzé, Paris, all of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "S.N.E.C.M.A.", Paris, France**

**Filed May 8, 1986, Ser. No. 860,864**
**Claims priority, application France, May 9, 1985, 85 06996**
**Int. Cl.[4] F01D 5/16**
**U.S. Cl. 416—224** **10 Claims**

10. An aircraft engine fan blade having a leading edge and a radially-outer tip portion wherein a fairing is secured to said leading edge at said tip portion, said fairing comprising:
a skin portion forming an extension of the intrados of the blade,
a skin portion forming an extension of the extrados of the blade,
a rounded apex portion interconnecting the skin portion at a zone remote from the leading edge of the blade, said apex portion having a radius of curvature less than that of the leading edge portion of the blades, and




reinforcement means located within said skin portions of the fairing.

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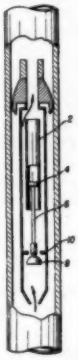
**4,712,981**

## PRESSURE-OPERATED VALVING FOR OIL AND GAS WELL SWABS

**Gramling William D., 5144 Newport Ave., Chevy Chase, Md. 20816**

**Continuation-in-part of Ser. No. 832,445, Feb. 24, 1986, abandoned. This application Oct. 29, 1986, Ser. No. 924,417**
**Int. Cl.[4] F04B 47/12**
**U.S. Cl. 417—56** **12 Claims**




1. In a swabbing device for pumping liquids from oil wells and other like wells, a connection member between the valve ball and the activating means for the valve ball, the connection member comprising:
a rod extending downwardly from said actuating means and coupling means disposed between the end of said rod and said valve ball which permits limited axial movement of said valve ball relative to said rod in response to fluid pressure acting upwardly on said valve ball.

**4,712,982**

## VARIABLE DISPLACEMENT WOBBLE PLATE TYPE COMPRESSOR WITH GUIDE MEANS FOR WOBBLE PLATE

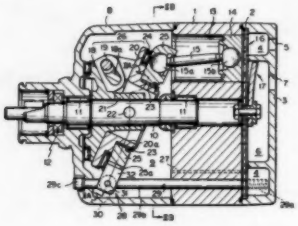
**Mitukane Inagaki; Masaki Ohta; Akihiko Hyodo; Kenji Takenaka; Takashi Mitibata; Shinichi Suzuki, and Hiroaki Kayukawa, all of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan**

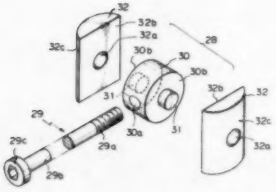
**Filed Mar. 21, 1986, Ser. No. 842,482**

**Claims priority, application Japan, Mar. 25, 1985, 60-60495; Jun. 19, 1985, 60-133781**

**Int. Cl.[4] F04B** *1/26;* **F16H** *23/00*

**U.S. Cl. 417—222** **7 Claims**





1. A variable displacement wobble plate type compressor including a compressor head having therein a suction chamber for a refrigerant to be compressed and a discharge chamber for a compressed refrigerant, a cylinder block having therein a plurality of cylinder bores in which associated reciprocatory pistons are disposed so as to draw the refrigerant from the suction chamber and then to discharge the refrigerant after compression to the discharge chamber, a crankcase connected to the cylinder block and receiving therein an axial drive shaft and an assembly of non-rotary wobble and rotatable drive plates mounted on the drive shaft so as to cause compressing motion of the reciprocatory pistons, a guide means for permitting inclination of the wobble plate from a plane perpendicular to the drive shaft while preventing any rotation of the wobble plate about the drive shaft, and a control means for changing an angle of inclination of the wobble plate so as to vary compressor displacement in association with a refrigerating load, wherein said guide means comprise:

a guide rod having a cylindrical extended major portion arranged so as to be axially extended in parallel with said drive shaft in said crankcase;

a slide axially slidable and rotatably mounted on said cylindrical extended major portion of the guide rod and having opposite lateral ends thereof, the slide having a pivot on each of the lateral outer ends thereof extending at a right angle to the guide rod;

a pair of shoes pivotally and coaxially mounted on said lateral ends of said slide, respectively, so as to axially slide with said slide along said guide rod and to rotate relative to said slide, each of said pair of shoes having, on a laterally outer face thereof, a semi-cylindrical convexed face extending in a direction across a sliding direction of said slide, each shoe having a through-hole rotatably fitting on each pivot of the slide; and

a radial slot formed in a part of a periphery of said wobble plate for slidably receiving said pair of shoes, said radial slot having a central opening permitting said guide rod to pass therethrough and a pair of semi-cylindrical convexed faces of said shoes while opposing one another.

7. A variable displacement wobble plate type compressor including a compressor head having therein a suction chamber for a refrigerant to be compressed and a discharge chamber for a compressed refrigerant, a cylinder block having therein a plurality of cylinder bores in which associated reciprocatory pistons are disposed so as to draw the refrigerant from the suction chamber and then to discharge the refrigerant after compression to the discharge chamber, a crankcase connected to the cylinder block and receiving therein an axial drive shaft and an assembly of non-rotary wobble and rotatable drive plates mounted on the drive shaft so as to cause compressing motion of the reciprocatory pistons, a guide means for permitting inclination of the wobble plate from a plane perpendicular to the drive shaft while preventing any rotation of the wobble plate about the drive shaft, and a control means for changing an angle of inclination of the wobble plate so as to vary compressor displacement in association with a refrigerating load, wherein said guide means comprise:

a guide rod having a cylindrical extended major portion arranged so as to be axially extended in parallel with said drive shaft in said crankcase;

a slide having an axial bore, the slide axially slidably and rotatably mounted on said guide rod and having opposite lateral conical convergent ends exiting at a right angle to the guide rod;

a pair of shoes pivotally and coaxially mounted on said lateral ends of said slide, respectively, so as to axially slide with said slide along said guide rod and to rotate relative to said slide, each of said pair of shoes having, on a laterally outer face thereof, a semi-cylindrical convexed face extending in a direction across a sliding direction of said slide, each of the shoes having a conical convergent recess complimentary with and rotatably fitting with each of the conical convergent ends of the slide; and

a radial slot formed in a part of a periphery of said wobble plate for slidably receiving said pair of shoes, said radial slot having a central opening permitting said guide rod to pass therethrough and a pair of semi-cylindrical concaved and parallel faces on opposite lateral sides and complementary with said semi-cylindrical convexed faces of said shoes while opposing one another.

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**4,712,983**

## AIR COMPRESSOR ACCESSORY DRIVEN BY PORTABLE ELECTRIC DRILL

**Patrick B. Moynihan, 1517 Charlestown Dr., Edgewood, Md. 21040**

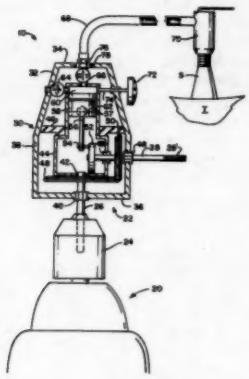
**Filed Nov. 8, 1985, Ser. No. 796,178**

**Int. Cl.[4] F04B** *35/00;* **F16H** *37/08*

**U.S. Cl. 417—234** **12 Claims**

1. An air compressor attachment adapted to be driven by a portable power drill, comprising a housing including a side wall and further including a rearward end wall, a casing within the housing, a transverse web supporting the casing within the housing, the casing including a forward portion extending forwardly of the transverse web and the casing further including a rearward portion extending rearwardly of the transverse web, the forward portion of the casing being formed as a cylinder having an axis and further having a cylindrical wall, such that the casing and the housing have a substantially continuous annular space therebetween, a first shaft rotatably supported between the rearward portion of the casing and the end wall of the housing, the first shaft being substantially coaxial with the axis of the cylinder, means for driving the first shaft by the portable power drill, a second shaft arranged substantially transversely of the first shaft, the second shaft being rotatably supported between the rearward portion of the casing and the side wall of the housing, the second shaft having a portion extending into the rearward portion of the casing,

bevel gears carried by the first and second shafts, respectively, and providing an rpm step-up between the first and second shafts, the bevel gears being disposed between the casing and housing, respectively, crank means driven by the extending portion of the second shaft within the rearward portion of the casing, a piston guided for reciprocation within the cylinder, means for connecting the piston to the crank means, air inlet



and exhaust means associated with the cylinder, and compressed air discharge means on the housing and communicating with the air exhaust means of the cylinder, and wherein the portable power drill may be held in one hand of the user, while the housing may be held in the other hand of the user, without regard to the heat generated by the reciprocation of the piston in the cylinder formed in the casing.

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**4,712,984**

## PROCESS AND APPARATUS FOR CIRCULATING FLUIDS BY PUMPING

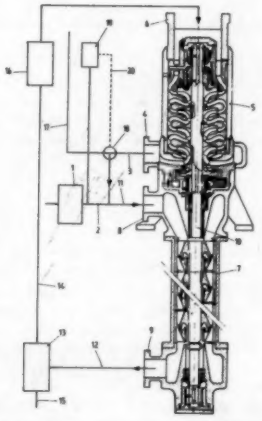
**Claude Lepert, Annecy le Vieux, France, assignor to Etablissements Pompes Guinard, Courbevoie, France**

**Filed Feb. 4, 1987, Ser. No. 10,686**

**Claims priority, application France, Feb. 10, 1986, 86 01763**

**Int. Cl.[4] F04B** *17/00*

**U.S. Cl. 417—391** **13 Claims**



**6**. Process for pumping fluid composed of a liquid phase and of a gaseous phase, comprising conveying liquid under pressure to the inlet of the turbine of a turbo-machine comprising a pump having an inlet and an outlet and a turbine which has an inlet and an outlet separate from those of the pump and which is keyed on the same shaft as the pump, mixing the fluid with liquid coming from the turbine in order to obtain a mixture, and sucking the mixture through the inlet of the pump, wherein only some of the liquid, representing the proportion necessary for reducing the gas content of the mixture to a value below that from which the mixture can be pumped into the pump, is mixed with the fluid, and transferring or returning the rest of the harnessed liquid.

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**4,712,985**

## DIESEL ENGINE FUEL INJECTION PUMP CAPABLE OF INJECTION TIMING ADJUSTMENT

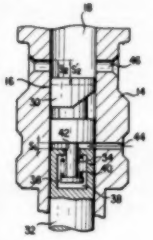
**Satoshi Wakasa, and Toru Okazaki, both of Oyama, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**Filed Jun. 27, 1986, Ser. No. 879,734**

**Claims priority, application Japan, Jul. 24, 1985, 60-112448[U]**

**Int. Cl.[4] F04B** *7/04, 39/10;* **F02M** *59/20*

**U.S. Cl. 417—486** **3 Claims**



**1**. A diesel engine fuel injection pump capable of injection timing adjustment, comprising:

(a) housing means;

(b) a plunger assembly reciprocably mounted within the housing means and defining a pumping chamber therein;

(c) the housing means having defined therein a fuel inlet port to the pumping chamber in a predetermined position in the longitudinal direction of the pumping chamber;

(d) drive means for reciprocably moving the plunger assembly within the pumping chamber between a first extreme position, where the fuel inlet port is uncovered by the plunger assembly for the admission of fuel into the pumping chamber, and a second extreme position, the plunger assembly starting the pressurization of the fuel upon completion of a prestroke extending from the first extreme position to an intermediate position where the plunger assembly covers the fuel inlet port;

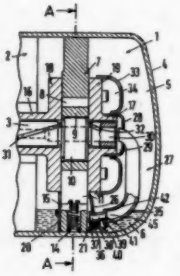
(e) the plunger assembly being formed of at least two transversely split segments movable toward and away from each other within limits and including resilient means biasing the segments of the plunger assembly toward each other; and

(f) the housing means further including a timing fluid inlet port for introduction of a timing fluid under variable pressure between the segments of the plunger assembly to move the plunger assembly segments away from each other to an extent that timing fluid pressure is counterbalanced by force of said resilient means for controllably varying the distance therebetween and, in consequence, for varying the prestroke of the plunger assembly solely in response to variation of said timing fluid pressure to effect adjustment of injection timing.

## 4,712,986
## OIL FEEDING APPARATUS FOR A ROTARY COMPRESSOR

**Harry S. Nissen, Sonderborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark**

**Filed Aug. 8, 1986, Ser. No. 894,580**
**Claims priority, application Fed. Rep. of Germany, Aug. 13, 1985, 3528963**
**Int. Cl.⁴ F04C *29/02***
**U.S. Cl. 418—63** **5 Claims**



1. A rotary compressor assembly, comprising a capsule having a lower part forming an oil sump, and an electric motor and a rotary compressor mounted in the capsule, the rotary compressor including a horizontal shaft driven by said motor, a housing having a rotary piston bore, at least in part defining a pump chamber that has a closed axial side and an opposite open axial side, and mounting the shaft for rotation, a rolling piston eccentrically mounted on the shaft, a vane mounted in the pump chamber, resiliently retained in engagement with the rolling piston to separate the housing bore into suction and pressure chambers, and reciprocably movable in the pump chamber to operate as a pump piston, an oil feeding conduit having a first end joined to and opening to the housing adjacent to the shaft and a second end adjacent to the sump, a venturi passage assembly having a first end joined to the conduit second end, said venturi passage assembly having an opposite second end, a venturi passage extending between the venturi assembly ends and in part is defined by a tapered bore portion convergingly, the bore portion having a larger cross sectional end more closely adjacent to the venturi assembly second end than the venturi assembly first end and a smaller cross section end that is more closely adjacent to the venturi assembly first end than the venturi assembly second end and an orifice opening to the venturi passage more closely adjacent to the bore portion smaller cross section end than the bore portion larger cross sectional end for placing the venturi passage in liquid communication with the oil sump to draw oil from the sump when oil flows from the pump chamber toward the conduit, the conduit having a passage in the second end that opens to the venturi passage and adjacent to the venturi passage is of a substantially larger cross section than the bore portion smaller cross section, and a side plate for closing the pump chamber opposite side and joined to the venturi assembly second end for placing the venturi second end in liquid communication with the pump chamber.

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## 4,712,987
## VANE COMPRESSOR PROVIDED WITH ENDLESS CAMMING SURFACE MINIMIZING TORQUE FLUCTUATIONS

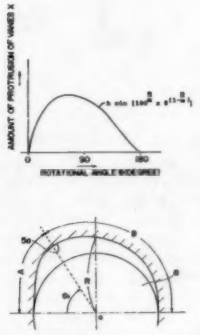
**Kenichi Inomata, Konan, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan**

**Filed May 13, 1986, Ser. No. 862,758**
**Claims priority, application Japan, May 22, 1985, 60-108358**
**Int. Cl.⁴ F04C *18/344***
**U.S. Cl. 418—150** **9 Claims**

1. In a vane compressor comprising: a pump housing having an endless camming inner peripheral surface; a cylindrical rotor rotatably received within said pump housing, said rotor having an outer peripheral surface, a plurality of axial slits being formed in said outer peripheral surface; a plurality of vanes radially movably fitted in said axial slits of said rotor; and a drive shaft coupled to said rotor for causing rotation of said rotor together therewith; whereby rotation of said rotor causes said vanes to slidingly move along said endless camming inner peripheral surface of said pump housing in a predetermined circumferential direction to define at least one pumping chamber between inner surfaces of said pump housing, the outer peripheral surface of said rotor and said vanes, for performing suction, compression and discharge of fluid;

the improvement wherein:

said endless camming inner peripheral surface of said pump housing has at least one portion for performing one cycle of suction, compression and discharge of fluid in cooperation with said vanes and said rotor, said at least one portion having a cam profile including:



an increasing radius portion along which the amount of protrusion of each vane from the rotor gradually increases with movement of the vane; and

a decreasing radius portion along which the amount of protrusion of each vane from the rotor gradually decreases with movement of the vane;

said increasing radius portion and said decreasing radius portion being continuously arranged in the order mentioned and in the moving direction of said vanes;

said increasing radius portion terminating in a first half of the whole circumferential length of said one cycle performing portion of said endless camming inner peripheral surface of said pump housing;

said cam profile of said one cycle performing portion of said endless camming inner peripheral surface being defined by only a single equation throughout the whole circumferential length of said one cycle performing portion of said camming inner peripheral surface from a starting end to a terminating end thereof.

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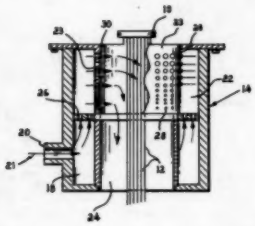
## 4,712,988
## APPARATUS FOR QUENCHING MELT SPRUN FILAMENTS

**Clarke R. Broaddus, and Bradley J. Gollhardt, both of Greenville, N.C., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**Filed Feb. 27, 1987, Ser. No. 20,019**
**Int. Cl.⁴ B29C *35/06***
**U.S. Cl. 425—725** **2 Claims**

1. In an apparatus for melt spinning polymer that includes a spinneret, means for passing molten polymer through the spinneret, a hollow cylindrical foraminous member positioned immediately below the spinneret and a plenum chamber supplied with a current of gas surrounding the foraminous mem-

ber to form a quench chamber for the filaments to pass through to its exit, the improvement for changing the gas distribution pattern inwardly toward the filaments in the chamber to a profile defined by maximum gas flow immediately below the



spinneret decreasing to a minimum gas flow at the exit of the quenching chamber comprising: forming said hollow foraminous member of decreasing porosity from a location immediately below the spinneret toward the exit of the quench chamber.

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**4,712,989**

## EXTRUSION MEANS FOR PRODUCING RUBBER PROFILES

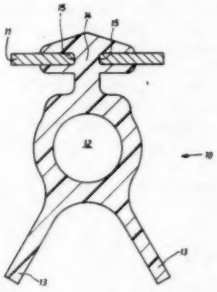
**Walter A. Schiesser, Giebeleichstrasse 70, 8152 Glattbrugg, Switzerland**

**Continuation of Ser. No. 682,933, Dec. 18, 1984, abandoned. This application Dec. 8, 1986, Ser. No. 940,226**

**Claims priority, application Switzerland, Dec. 23, 1983, 6922/83**

**Int. Cl.[4] B29C** *47/02*

**U.S. Cl. 425—114** **13 Claims**



**1.** Extrusion means for producing rubber profiles from extruded rubber mass, said profiles having a heel section, said heel sections having a spring elastic supporting strip partly embedded therein to form rubber free edge sections projecting out of the edges of the profiles,

the extrusion means comprising:

an extrusion die having an outer, downstream side, which is downstream in relation to the movement of the extruded rubber mass through the die, the die having an inner, upstream side which is upstream in relation to the movement of the extruded rubber mass through the die; an extrusion opening through the die, which opens at the downstream side of the die in a cross-sectional shape corresponding to the cross-section of the profiles to be extruded; a recess defined in the upstream side of the die, and communicating into the extrusion opening and having a first cross section across the extrusion opening;

an extrusion head disposed upstream of the die for supplying rubber mass through the extrusion die, the extrusion head comprising an extrusion pin projecting downstream toward the die and having a downstream end portion which projects into the recess in the die, the downstream end portion of the extrusion having a cross sectional shape that corresponds to the first cross section of the recess in the die, and the extrusion pin being sealingly located in the recess in the die;

the extrusion pin further including and defining a first passage through the extrusion pin for supplying to the extrusion die rubber mass received from the extrusion head; the extrusion pin including a second passage therethrough which is of a shape for passing along the supporting strip of the profiles.

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**4,712,990**

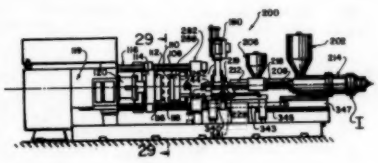
## APPARATUS FOR INJECTION MOLDING AND INJECTION BLOW MOLDING MULTI-LAYER ARTICLES

**Frederick G. Kudert, Niles; Maurice G. Latreille, Batavia; Robert J. McHenry, St. Charles; George F. Nahill, Crystal Lake, all of Ill.; Henry Pfutzenreuter, III, Alta Loma, Calif.; William A. Tennant, Schaumburg, Ill.; Thomas T. Tung, Hoffman Estates, Ill., and John Vella, Jr., Aurora, Ill., assignors to American Can Company, Greenwich, Conn.**

**Filed Apr. 13, 1983, Ser. No. 484,707**

**Int. Cl.[4] B29C** *45/16, 45/22, 49/22*

**U.S. Cl. 425—130** **123 Claims**



**1.** Apparatus for a multi-layer injection molding machine, which comprises

a co-injection nozzle having

a gate at one end,

a central channel in communication with the gate,

at least three polymeric melt material flow stream passageways in communication with the central channel, each passageway having an associated orifice whereat the passageway communicates with the central channel, wherein the first of said orifices is more proximate the gate than said other orifices, the third of said orifices is operative at a position more remote from the gate than said first orifice, and the second of said orifices is located between the first and third orifices, and

valve means moveable in the co-injection nozzle central channel, operative with respect to said orifices and adapted to block and unblock and prevent and allow the flow of polymeric melt material through the orifices into said central channel, said valve means being adapted to in one position block said second orifice while it does not block the first or third orifice or both the first and third orifices.

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**4,712,991**

## HYDRAULIC CONTROL SYSTEM FOR INJECTION UNIT OF INJECTION MOLDING MACHINE

**Karl Hehl, Arthur-Hehl-Strasse 32, 7298 Lossburg 1, Fed. Rep. of Germany**

**Filed Dec. 30, 1985, Ser. No. 814,605**

**Claims priority, application Fed. Rep. of Germany, Dec. 28, 1984, 3447605**

**Int. Cl.[4] B29C** *45/82*

**U.S. Cl. 425—145** **17 Claims**

**1.** A hydraulic control system for the operation of a plurality of hydraulic drive assemblies of the type which are used in the hydraulic drive system of an injection unit of a plastics injec-

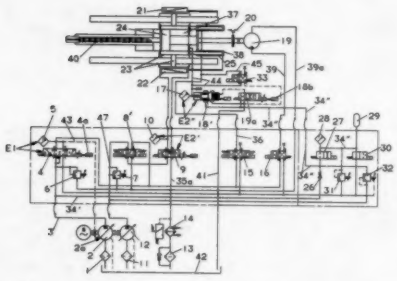
tion molding machine, the hydraulic control system comprising in combination:

a main pump feeding drive fluid to a supply line, the main pump being in the form of a first variable delivery pump of comparatively large capacity which includes a pump adjustment unit for the continuous adjustment of the output of the main pump;

a first branch line leading from the supply line to a first drive assembly of the hydraulic drive system, the first branch line including a first switching valve;

a pressure maintenance pump in the form of a second variable delivery pump of comparatively small capacity, the pressure maintenance pump feeding drive fluid to the first switching valve, the first switching valve being operable to selectively connect the first drive assembly to either of said two pumps, whereby the output of the main pump is used to generate displacements of the first drive assembly and the output of the pressure maintenance pump is used to maintain the first drive assembly under pressure, after the first drive assembly has reached a displacement end point; and

a first control unit arranged in the supply line, between the main pump and the first branch line, the first control unit including a first proportional P/Q valve, where P is pressure and Q is flow rate, a feedback line leading from the supply line on the downstream side of the first proportional P/Q valve to the pump adjustment unit of the main pump, displacement transducing means operable to provide feedback-control for the execution of a displacement-referenced control program on the pump adjustment unit of the main pump, and a pressure transducer arranged in the supply line, on the downstream side of the first proportional P/Q valve, providing feedback control for the execution of a pressure-referenced control program on the pump adjustment unit of the main pump, at pressures in the supply line which exceed a predetermined pressure level at which the first proportional P/Q valve converts from volume control to pressure control, the pump adjustment unit being set for the maintenance of a predetermined constant pressure gradient in the supply line between the upstream and downstream sides of the first proportional P/Q valve.



**8.** A hydraulic control system for the operation of a plurality of hydraulic drive assemblies, such as the linear and rotary hydraulic drive assemblies which drive an injection unit of a plastics injection molding machine, which drive assemblies include a first cylinder assembly for the movement of the injection unit into engagement with and away from an injection molding die of the injection molding machine, a second cylinder assembly of axially advancing a plastification screw inside a plastification cylinder in an injection stroke and for exerting counter-pressure on the plastification screw during a plastification stroke, a third cylinder assembly for retracting the plastification screw away from the injection molding die, and a rotary drive assembly for the rotation of the plastification screw during the plastification stroke, the hydraulic control system comprising in combination:

a main pump in the form of a first variable delivery pump which includes a pump adjustment unit for the continuous adjustment of the output of the main pump;

a first supply line and a second supply line connected to the output side of the main pump, the first supply line leading to the first cylinder assembly and the second supply line leading to the second cylinder assembly;

a first switching valve arranged in the first supply line;

a first control unit arranged in the first supply line, between the main pump and the first switching valve, the first control unit including a first proportional P/Q valve where P is pressure and Q is flow rate, a feedback line leading from the first supply line on the downstream side of the first proportional P/Q valve to the pump adjustment unit of the main pump, displacement transducing means operable to provide feedback-control for the execution of a displacement-referenced control program on the pump adjustment unit of the main pump, and a pressure transducer arranged in the first supply line, on the downstream side of the first proportional P/Q valve, providing feedback control for the execution of a pressure-referenced control program on the pump adjustment unit of the main pump, at pressures in the first supply line which exceed a predetermined pressure level at which the first proportional P/Q valve converts from volume control to pressure control, the pump adjustment unit being set for the maintenance of a predetermined constant pressure gradient in the first supply line between the upstream and downstream sides of the first proportional P/Q valve; and

a second control unit arranged in the second supply line, the second control unit inluding a second proportional P/Q valve, displacement transducing means operable to provide feedback-control for the execution of a displacement-referenced control program on the pump adjustment unit of the main pump, and a pressure transducer arranged in the second supply line, on the downstream side of the second proportional P/Q valve, providing feedback control for the execution of a pressure-referenced control program on the pump adjustment unit of the main pump, at pressure in the second supply line which exceed a predetermined pressure level at which the second proportional P/Q valve converts from volume control to pressure control; and wherein

the first and second control units are arranged to cooperate in such a way that, for a movement of the injection unit against the injection molding die through the operation of the first cylinder assembly, the second proportional P/Q valve of the second control unit is closed and, for the execution of an injection stroke of the plastification screw through the operation of the second cylinder assembly, the first switching valve in the first supply line disconnects the first proportional P/Q valve from the first supply line, while the first proportional P/Q valve maintains a predetermined constant pressure gradient in the second supply line between the upstream and downstream sides of the second proportional P/Q valve.

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**4,712,992**

## EXTRUDER WITH SCREW HAVING CORE PORTION OF POLYGONAL CROSS-SECTION

**Heung-Tai Kim, Avon Lake, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio**

**Filed Jun. 12, 1986, Ser. No. 873,646**

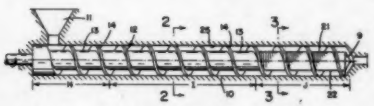
**Int. Cl.[4] B29C *47/60***

**U.S. Cl. 425—207** **17 Claims**

**6.** A screw conveyor for converting plastic material from the solid phase to a viscous or liquid form comprising a longitudinally extending core, a helical flight on said core extending continuously from one end of said core to the other end of said core, said core with said helical flight having one end portion

terminating at said one end defining a metering section, said core with said helical flight having an intermediate portion extending downstream and terminating at said metering section defining a melt section, said core with said helical flight having the other end portion beginning at said other end of said core and terminating as said melt section defining a feed section, the core of each of said sections having a portion of its length cylindrical in cross-section and the remaining portion of its length polygonal in cross-section.

12. An extruder having a housing with a cylindrical bore extending longitudinally therethrough; said cylindrical bore having a smooth surface; a screw conveyor journaled in said cylindrical bore for converting plastic material from the solid phase to a viscous or liquid form; said screw having a core; a



circumferentially extending flight means encompassing said core for the full length thereof; one end portion of said core with the flight means encompassing such portion defines a feed section; the other end portion of said core with the flight means encompassing such portion defines a metering section; said core between said feed section and said metering section cooperative with the flight means encompassing such portion to define a melting section for plasticating such plastic material, changing said plastic material into a fluid phase; said core of said feed section and said melting section having a cylindrical cross-section; and said core in said metering section having a polygonal cross section presenting plasticating and force-producing components on such plastic material in any one turn of said flights in cooperative action with said flights of said metering section.

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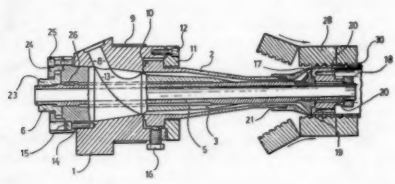
**4,712,993**

## EXTRUSION DIE FOR EXTERNALLY RIBBED PLASTIC TUBING

**Manfred A. A. Lupke, 92 Elgin St., Thornhill, Ontario, Canada L3T 1W6**

**Filed Mar. 25, 1986, Ser. No. 843,516**
**Int. Cl.[4] B29C *47/22***
**U.S. Cl. 425—466** **4 Claims**



1. An extrusion die for an apparatus producing seamless plastic tubing having a smooth inner surface and an annularly ribbed outer surface defined by alternating ribs and grooves, including:

an extrusion head having a central bore with a lateral opening for receiving an extrudate of a thermoplastic material under pressure therefrom,

an elongate nozzle attached to said head and providing a supply passage extending in the longitudinal direction thereof for the delivery of said extrudate to the delivery end thereof,

a hollow mandrel placed in said bore in substantially coaxial relation with said nozzle and spaced from the latter to provide a plastic conducting passage extending in the longitudinal direction thereof for the delivery of said extrudate to the delivery end thereof, the nozzle and mandrel defining respectively the annular extrusion orifice of diminishing interior dimensions, through which the extrudate can flow uninterruptedly and form a parison within the nozzle and around the mandrel, said delivery end of the mandrel having a coaxial external conical portion;

a threaded adjusting member for adjusting longitudinally said mandrel, effective to vary the size of the extrusion orifice when the mandrel is axially adjusted;

a coupling means interconnecting said mandrel and the head and allowing only the axial, without rotation, movement of the mandrel.

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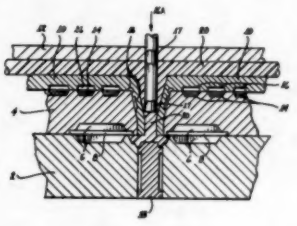
**4,712,994**

## APPARATUS FOR COLD RUNNER TRANSFER MOLDING

**Richardus H. J. Fierkens, Herwen, and Ireneus J. T. M. Pas, Rozendaal, both of Netherlands, assignors to ASM Fico Tooling, b.v., Herwen, Netherlands**

**Continuation of Ser. No. 628,621, Jul. 6, 1984, abandoned. This application Oct. 15, 1986, Ser. No. 919,580**
**Int. Cl.[4] B29C *45/72***
**U.S. Cl. 425—543** **5 Claims**



1. A mold apparatus for the transfer molding of a plurality of small objects, comprising:

a cavity block;

a plurality of cavities in said cavity block;

gate means for admitting a plastic molding material to each of said cavities;

a runner block;

runner means in said runner block for permitting the flow of plastic molding material therethrough;

plunger means having a plunger tip for forcing said plastic molding material into said plurality of mold cavities and for maintaining said plastic material under high pressure in said cavities;

insulating means for providing thermal insulation between said runner block and said cavity block;

cooling means in contact with said runner block for inhibiting curing of said plastic molding material in said runner block; said cooling means comprising a plurality of coolant passageways at a surface of said runner block, said passageways being partially bounded by said insulating means;

local heating means within said cavity block for heating said plastic molding material prior to said plastic molding material entering said plurality of cavities, said heating means being proximately located in a common passageway within said gate means abutting object cavities wherein curing of said small objects are to take place; and

said cavity block further having an upper portion and a lower portion, said runner block further having a tapered inner bore, said cooling means being located in said upper portion of said cavity block and surrounding said runner block adjacent to said tapered bore of said runner block, said heating means being a solid plug member and located

directly below said tapered bore of said runner block and in said lower portion.

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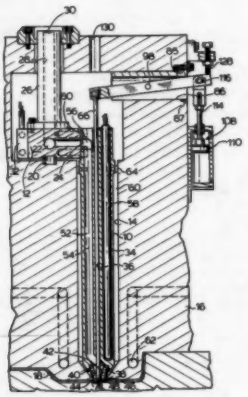
4,712,995

## REPLACEABLE ROCKER ARM ASSEMBLY FOR INJECTION MOLDING SYSTEM

David T. Basnett, Bramalea, Ontario, Canada, assignor to Die-Mold Tool Ltd. and Mold-Masters Limited, both of Georgetown, Canada

Filed Apr. 1, 1987, Ser. No. 32,549
Claims priority, application Canada, Mar. 19, 1987, 532,489
Int. Cl.[4] B29C *45/23*
U.S. Cl. 425—562 9 Claims



1. In a valve gated injection molding system having at least one heated nozzle seated in a mold core, the nozzle having a bore in alignment with a gate extending from a melt passage to a cavity, a rocker arm assembly with a pivoted rocker arm, said rocker arm having inner and outer elongated ends, an elongated valve pin having a driven end and a tip end, the valve pin extending through the bore of the nozzle with the driven end being operatively connected to the inner end of the rocker arm and the outer end of the rocker arm being operatively connected to a valve pin actuating mechanism, whereby the valve pin is reciprocated between a retracted open position and a closed position wherein the tip end of the valve pin is seated in the gate, the improvement wherein;

the rocker arm assembly comprises a rocker arm support member and the elongated rocker arm being pivotally mounted on the support member, the rocker arm asssembly being mounted in a bore in the mold, said bore having an inner and an outer end, the rocker arm being disconnectable from the valve pin and the actuating mechanism, and the rocker arm assembly being removably received through the outer end of the bore, whereby the rocker arm assembly can be replaced without disassembly of the mold.

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4,712,996

## GAS BURNER CONTROL SYSTEM WITH MASS FLOW SENSOR

John T. Adams, St. Louis, and John B. Goodale, St. Charles County, both of Mo., assignors to Emerson Electric Co., St. Louis, Mo.

Filed Nov. 21, 1986, Ser. No. 933,558
Int. Cl.[4] F23N *3/00*
U.S. Cl. 431—20 12 Claims

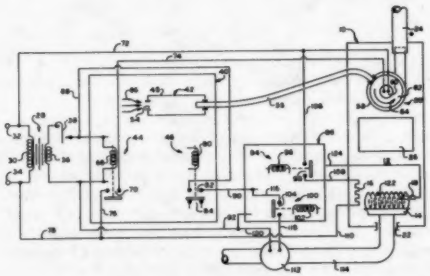
1. In a gas burner control system for controlling operation of a furnace wherein the furnace is provided with a blower fluidically connected to the combustion chamber of the furnace,

a mass flow sensing device connected fluidically in an air flow path between ambient air and a low pressure portion of a fluid flow path controlled by the blower whereby said ambient air is caused to be drawn in so as to establish an air flow through said sensing device when said blower is operating;

said sensing device including first and second temperature sensitive sensors and a heating means;

said heating means being positioned in heat conductive relationship with said second sensor, and wherein said air flow through said sensing device causes a transfer of heat from said second sensor to the moving air of said air flow; and

circuit means connected to said sensing device for initiating operation of said blower, for energizing said heating means so as to establish a predetermined temperature difference between said first and second sensors, and for effecting burner operation when the degree of energizing



of said heating means is the degree required to establish said predetermined temperature difference in the presence of the proper mass flow value of said air flow through said sensing devices,

wherein said circuit means includes first and second operational amplifiers, wherein said first sensor is connected to one of the inputs of said first amplifier, wherein the other of the inputs of said first amplifier is connected to input and feedback circuit means for establishing a gain greater than 1 for said first amplifier, wherein said second sensor is connected to one of the inputs of said second amplifier, wherein the other of the inputs of said second amplifier is connected to the output of said first amplifier, wherein the output of said second amplifier controls energizing of said heating means, and wherein said input and feedback circuit means includes resistors with selected values of resistance for controlling said output of said second amplifier.

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4,712,997

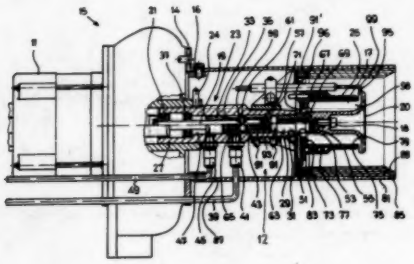
## BURNER, IN PARTICULAR BURNER FOR THE COMBUSTION OF LIQUID FUEL IN THE GASEOUS STATE

Jörg Füllemann, obere Hauser, CH-7302 Mastrils, and Heinrich Boner, Malans, both of Switzerland, assignors to Jörg Füllemann, Mastrils, Switzerland

Filed Dec. 23, 1986, Ser. No. 946,190
Claims priority, application Switzerland, Dec. 30, 1985, 5568/85
Int. Cl.[4] F23J *5/02*
U.S. Cl. 431—89 23 Claims

1. A burner comprising a motor (11) to drive a fan (15) and a fuel pump (13); a gasification chamber (25) formed by a housing (75), said gasification chamber (25) being provided with at least one heatable wall; rotatable means (17) located in the gasification chamber (25), said rotatable means (17) having a drive shaft (19) coupled to the motor (11); and a sleeve (23) enclosing the drive shaft (19) and serving as fuel supply means into the gasification chamber (25); characterized in that a first axial bearing surface (51) is provided by the end of the sleeve

(23) located proximate to the gasification chamber (25), that the rotatable means (17) provides a second axial bearing surface (53), and that actuating means (55, 57) are provided to



move the two axial bearing surfaces (51, 53) apart from each other or toward each other to supply fuel into the gasification chamber (25) according to the heating requirements, or to stop fuel supply.

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**4,712,998**

## MIXING ARRANGEMENT FOR A COMBUSTIBLE GAS MIXTURE

**Hans-Jürgen Conrad, Rutesheim, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

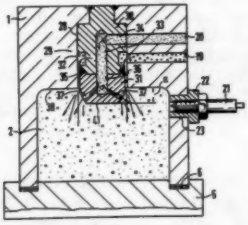
**PCT No. PCT/DE86/00045, § 371 Date Oct. 9, 1986, § 102(e) Date Oct. 9, 1986, PCT Pub. No. WO86/05258, PCT Pub. Date Sep. 12, 1986**

**PCT Filed Feb. 8, 1986, Ser. No. 932,504**

**Claims priority, application Fed. Rep. of Germany, Mar. 5, 1985, 3507669**

**Int. Cl.[4] F27B *3/00***

**U.S. Cl. 432—159** **8 Claims**



1. A mixing arrangement for a combustible gas mixture consisting of at least two gas components for treating materials by means of temperature and pressure shocks obtained by igniting the gas mixture, in particular for thermic deburring installations, comprising a mixing chamber; an ignition device; and feeding lines for feeding gas components into the mixing chamber and discharging into the mixing chamber, the feeding lines being each provided in a discharging area thereof with a jet arrangement (35, 37, 40) which forces gas flows discharged therefrom to take a sharp and direction which enhance the admixture of the gas components before they enter the mixing chamber (2); the jet arrangement (35, 37, 40) including an annular slot jet (35) for feeding one gas component and a multiple hole jet (37, 40) for a second gas component and directed towards a gas flow discharging from the annular slot jet, said annular slot jet (35) being formed by a bore (28) provided in a wall of the mixing chamber and a bolt (29) centrally inserted in said bore and made from a heat resistant material, said bolt having one portion (31) which has an end which faces the mixing chamber (2) and has an extension (a) projecting from a wall face (38) of the mixing chamber, and another portion (30), said multiple hole jet (37, 40) being formed in said extension at said end of said one portion.

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**4,712,999**

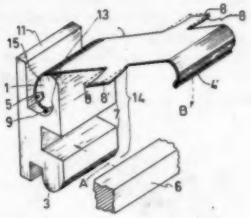
## CONVERTIBLE, SELF-LIGATING, ARCHWIRE POSITIONING ORTHODONTIC BRACKET

**Farel Rosenberg, 10535 Wilshire Blvd., Los Angeles, Calif. 90024**

**Filed Sep. 10, 1986, Ser. No. 905,409**

**Int. Cl.[4] A61C *7/00***

**U.S. Cl. 433—8** **7 Claims**



1. An orthodontic bracket assembly comprising:

a. a base structure having transverse and integral upper and lower semi-cylindrical extensions and also containing a transverse slot between said extensions to receive an archwire;

b. a cover plate formed at both ends into semi-cylindrical sections, the top cylindrical section being of greater circumference and incorporating a tab at each side and adapted to slide over the said top semicylindrical extension and thus act as a hinge, the lower semi-cylindrical section acting as a clip to fit over and lock with the lower semi-cylindrical extension, said cover plate being able to remain in any open position by friction in the hinge;

c. an archwire seating member incorporated in the cover plate so as to be aligned with the slot in the base structure when the cover plate is rotated to a closed position;

whereby the cover plate can be rotated into the open position, an archwire introduced into the slot and the cover plate rotated closed until said clip engages with the lower semi-cylindrical extension, forcing the seating member against the archwire and achieving various degrees of play and seating against the bottom of the slot depending on the archwire size and configuration and the size of the seating member; conversely disengaging the clip permits the cover plate to be rotated into its open position thus unlocking the archwire, the process being easily repeatable for the number of cycles required during the course of the treatment without the bracket being subject to accidental opening and disassembly during normal activities by the patient, said tabs being bent at right angles to the rest of the plate thus confining the plate axially with respect to the semi-cylindrical extensions and restricting its movement to a radial direction.

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**4,713,000**

## MOLAR CONTROLLING AND POSITIONING ORTHODONTIC APPLIANCE ADJUSTABLE IN THREE PLANES

**Farel Rosenberg, 10535 Wilshire Blvd., Los Angeles, Calif. 90024**

**Filed Feb. 12, 1987, Ser. No. 14,631**

**Int. Cl.[4] A61C *7/00***

**U.S. Cl. 433—18** **1 Claim**

1. A dental appliance for use as a tooth movement inhibitor, inducer and controller comprised in combination of:

a. a plate shaped to bear against tissue-covered basal bone

areas, said plate being mounted about and partially enclosing a primary rod;

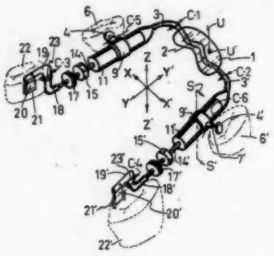
b. cylindrical force exerting members on both sides of the appliance each of the members terminating at one end in tubing to slidably and crimpably fit over an end of the primary rod for horizontal adjustment and fitting of the appliance;

c. springs contained within said cylindrical force exerting members;

d. piston heads contained within said cylindrical force exerting members and pressing against the springs and terminating in threaded piston rods;

e. connecting fixtures which are internally threaded to receive the threaded piston rods on their forward ends, said fixtures terminating in vertical extensions;

f. u-shaped tubing sections which slide over and are crimpable to said vertical extension of the connecting fixtures on each side of the appliance and are flattened at their far



ends to fit into receptacles which have been previously cemented to rear molars;

g. retaining plates which bear on the surfaces of the cylindrical force exerting members, said retaining plates having hollow neck sections which slide over and are crimpably mounted to wires extending from buttons attached to the lingual surface of forward teeth on each side of the mouth;

whereby the appliance is assembled in the mouth, the crimpable fits between said primary rod and the force exerting members, between the tubing sections mounting in the molar receptacles and the connecting fixtures, and between the retainplates, hollow necks and the wires extending from the buttons cemented to the lingual surfaces of the forward teeth are adjusted as the individual case need dictate and then crimped to hold the appliance rigidly in the mouth to permit subsequent rotation of the threaded pistons in carrying out backward tooth movement, movement inhibition or controlled forward slippage.

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**4,713,001**

**ORTHODONTIC BRACKET-MOUNTED TRACTION HOOK**

**Paul E. Klein, 928 Lake Shore Road, and Douglas J. Klein, 901 Lake Shore Road, both of Lake Oswego, Oreg. 97034**

**Filed Aug. 25, 1986, Ser. No. 900,330**

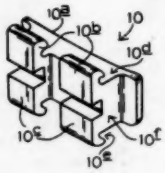
**Int. Cl.[4] A61C *7/00***

**U.S. Cl. 433—18** **9 Claims**

1. An orthodontic traction-hook device adapted for selective, removable attachment to at least a pair of the outwardly projecting posts in an orthodontic bracket, where such posts include oppositely directed flanges which at least partially define inwardly facing, spaced channels, said device comprising

a pair of spaced, interconnected legs constructed for releasable securement in such channels, with each leg disposed in a different channel, and

a projection joined to said legs, adapted to accommodate the connection thereto, by hooking, of an orthodontic, traction-applying instrumentality, said projection, with the



device mounted in place on a bracket, extending in spaced, freely exposed relation away from the latter.

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**4,713,002**

**DENTAL MIRROR**

**Dwight W. Presser, West Bloomfield Township, Oakland County, Mich., and Joseph J. Berke, 3333 E. Jefferson St., Detroit, Mich. 48207, assignors to Joseph J. Berke, Bloomfield Hills, Mich.**

**Filed Oct. 9, 1985, Ser. No. 785,922**

**Int. Cl.[4] A61C *1/00, 3/00***

**U.S. Cl. 433—30** **14 Claims**

1. In an instrument of the type including an elongated handle and a disc-like mirror mounted at one end of the handle, said mirror having a mirror face, the improvement comprising:

a protective shield over the disc-like mirror, the protective shield sealed relative to said mirror face to prevent fluids from entering therebetween; and

the protective shield is formed as a portion of a sphere.

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**4,713,003**

**FIXTURE FOR ATTACHING PROSTHESIS TO BONE**

**John M. Symington, Etobicoke, and Robin D. Listrom, Willowdale, both of Canada, assignors to University of Toronto Innovations Foundation, Toronto, Canada**

**Filed May 19, 1986, Ser. No. 864,804**

**Claims priority, application Canada, May 17, 1985, 481851**

**Int. Cl.[4] A61C *8/00***

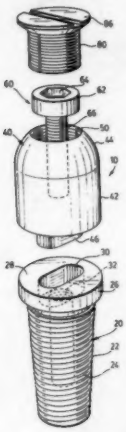
**U.S. Cl. 433—173** **12 Claims**

1. A device for using and connecting a prothesis to bone, which comprises:

an implant for integration with bone, the implant having a head defining an upper surface and an externally threaded shaft depending therefrom, the shaft tapering downwardly from the head;

an abutment to receive the prothesis, the abutment having a lower surface complementary to the upper surface of the head of the implant, one of either of said lower surface of the abutment or said upper surface of said implant bearing a tongue and the other defining a complementary groove, said tongue and groove interfitting to prevent relative rotation therebetween, said abutment defining a first bore extending longitudinally through said abutment and along a central axis thereof and said implant defining a screw threaded second bore adapted to align with said first bore

of said abutment extending longitudinally from said upper surface of said implant along a central axis of said implant, said abutment defining a seat coaxial with said first bore and superior thereto; and



connecting means for connecting the abutment to the implant at the complementary surfaces, said connecting means comprising a bolt having a head and a screw threaded portion such that when the bolt is in its connecting position, the head of the bolt engages with said seat and the screw threaded portion engages said second bore.

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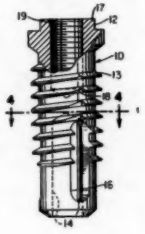
**4,713,004**

## SUBMERGIBLE SCREW-TYPE DENTAL IMPLANT AND METHOD OF UTILIZATION

**Leonard I. Linkow, New York, N.Y., and Anthony W. Rinaldi, Philadelphia, Pa., assignors to Vent Plant Corporation, Philadelphia, Pa.**

**Filed Sep. 4, 1986, Ser. No. 904,381**
**Int. Cl.[4] A61C *13/00***
**U.S. Cl. 433—174** **33 Claims**



1. An implant portion of an oral implant designed for supporting an artificial tooth structure comprising:

an implant body having threads over at least part of its exterior surface and being adapted to be threaded into an opening in a bone of a patient in the vicinity of the occlusal plane, which bone has been exposed by an incision in the covering fibromucosal tissue; and

at least one channel formed such that it at least extends through the threads on the body for directing bone chips toward a base portion of the opening in the bone, one edge of the threads at one side of the channel being substantially at a right angle to the circumferential direction of the threads and the other edge of the threads at the other side of the channel being at an oblique angle to the circumferential direction of the threads, said one edge being adapted (i) to promote self-tapping of the threads in the bone, (ii) to shave off pieces of bone during threading of the implant portion into the bone, and (iii) to direct the pieces of bone into the channel such that the channel may direct pieces toward the base portion of the opening.

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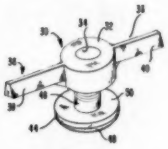
**4,713,005**

## METHOD AND APPRATUS FOR MAKING A DENTAL PROSTHESIS AND PRODUCT THEREFROM

**Howard B. Marshall, 301 W. 53rd St., Apt. 21K, New York, N.Y. 10019; Gordon E. Kaye, Garrison, N.Y., and Ira L. Lopata, Palm Beach, Fla., assignors to Howard B. Marshall, New York, N.Y.**

**Filed Sep. 2, 1986, Ser. No. 903,641**
**Int. Cl.[4] A61C *13/22***
**U.S. Cl. 433—180** **55 Claims**



1. A method of forming at least one pontic in situ in an edentulous space defined adjacent at least one tooth and lightly touching the adjacent gum surface, comprising the steps of:

drilling the occlusal surface of said at least one tooth to form at least one groove;

positioning a bridge bar assembly including, at least one boss and a pontic base adjustably mounted on each said boss, in said edentulous space such that at least one side of said bridge bar assembly can be fixedly connected in said at least one groove;

adjusting each said pontic base to a position lightly touching the gum surface in said edentulous space;

placing mold means about said edentulous space;

filling said mold means with a pontic forming material to form said at least one pontic surrounding said at least one boss on the bridge bar assembly;

making said pontic forming material set;

removing said mold means;

polishing the sides and undersurface of each formed pontic; and

cementing said bridge bar assembly in said at least one groove to secure said at least one pontic in assembled position.

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**4,713,006**

## ARTIFICIAL TOOTH ROOT

**Yasuharu Hakamatsuka, Tokyo, and Nobuyuki Yokoyama, Chiba, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

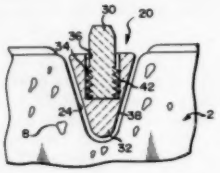
**Filed Mar. 26, 1986, Ser. No. 844,210**
**Claims priority, application Japan, Apr. 4, 1985, 60-71375**
**Int. Cl.[4] A61C *8/00*; A61F *1/24***
**U.S. Cl. 433—201.1** **10 Claims**

1. An artificial tooth root implantable in a recess formed in an alveolar bone portion, comprising:

an artificial tooth root body;

a root holder, which is insertable into said alveolar bone recess, at least that portion of an outer surface of said root holder that is in contact with the alveolar bone portion being formed of biologically activated material, said root holder having walls defining a receiving recess in said root holder and into which said artificial tooth root body is fitted; and

an impact reducing means including a silicon rubber impact absorbing material and an adhesive provided between said artificial tooth root body and said walls of said root holder




defining said receiving recess, for elastically boding said tooth root body to said root holder and for reducing impact on said root holder.

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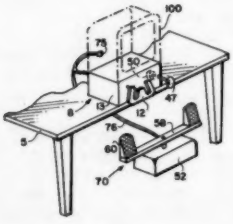
**4,713,007**

## AIRCRAFT CONTROLS SIMULATOR

**Eugene P. Alban, 312 Temko Terr., Daytona Beach, Fla. 32018**

**Filed Oct. 11, 1985, Ser. No. 786,871**
**Int. Cl.[4] G09B *9/08***
**U.S. Cl. 434—45** **10 Claims**




1. A simulated aircraft control system for providing input signals to computer flight simulation programs to thereby produce graphic flight simulation displays on a personal computer screen comprising:

a chassis having a first bracket disposed vertically and attached thereto;

a first electrical potentiometer having a control shaft and attached to said chassis

a simulated aircraft yoke control having a yoke shaft projecting therefrom, said shaft supported in a horizontal position by said first bracket, and rotatable and movable horizontally with respect to said first bracket by said yoke control;

a second electrical potentiometer having a control shaft, said control shaft directly connected to said yoke shaft, said second potentiometer having a second bracket disposed horizontally and attached thereto, said second bracket and said second potentiometer movable horizontally by said yoke shaft, said second bracket including means for preventing said second bracket from rotating when said yoke control and yoke shaft are rotated thereby causing rotation of said yoke shaft to operate said second potentiometer; and

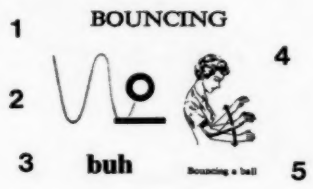
first coupling means for coupling said second bracket to said control shaft of said first potentiometer for rotating same when said second bracket is moved horizontally.

**4,713,008**

## METHOD AND MEANS FOR TEACHING A SET OF SOUND SYMBOLS THROUGH THE UNIQUE DEVICE OF PHONETIC PHENOMENA

**Elizabeth M. Stocker, 3947 Bandini, San Diego, Calif. 92103, and Eugene U. Knight, III, P.O. Box 268, Phelan, Calif. 92371**

**Filed Sep. 9, 1986, Ser. No. 905,786**
**Int. Cl.[4] G09B *19/00***
**U.S. Cl. 434—167** **14 Claims**




1. A method of teaching, comprising:

presenting a discrete language sound to a student,

presenting a depiction of a soniferous event to said student, said soniferous event consisting of an event distinct from articulation of said language sound, and comprising an environmental sound comprising a character similar to that of said language sound,

presenting an indicium to said student,

whereby said student can be taught to associate said indicium with said language sound without using a skill comprising a knowledge of phonemic segmentation.

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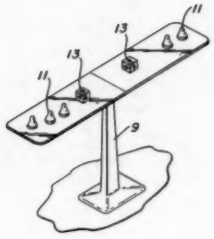
**4,713,009**

## TEACHING APPARATUS AND METHOD FOR SOLVING ALGEBRAIC LINEAR EQUATIONS

**Henry Borenson, 1469 Neshaminy Valley Dr., Bensalem, Pa. 19020**

**Filed Jun. 11, 1986, Ser. No. 872,845**
**Int. Cl.[4] G09B *19/02, 23/02***
**U.S. Cl. 434—188** **10 Claims**




1. A device for solving a given linear algebraic equation, comprising:

(a) a reference line which has an indicated center point for the purpose of giving the cognitive impression of balance,

(b) a plurality of markers, each marker representing a unit amount of an unknown quantity,

(c) a plurality of numbered cubes for representing numerical values whereby said markers and cubes are arranged in clusters on both sides of said center point to represent said equation and thereafter rearranged according to rules of movement in order to simplify said equation until the value of the unknown quantity is obvious, said markers, cubes, reference line, and center point, being the only articles used for representing elements of said equations

without any indicator means for representing mathematical operations.

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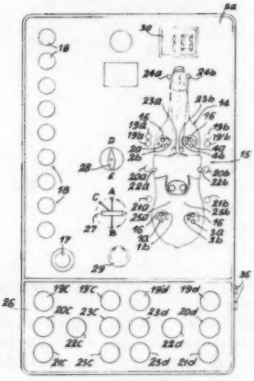
**4,713,010**

## APPARATUS FOR SIMULATING THE DIFFERENT PACES OF A HORSE AND THE AIDS TO BE APPLIED FOR CONTROLLING THE HORSE

**Paul Veillas, Domaine de Saint-Aubin, Saint-Aubin, F-91190 Gif-sur-Yvette, France**

**Filed Jul. 2, 1986, Ser. No. 881,299**
**Claims priority, application France, Jul. 4, 1985, 85 10198**
**Int. Cl.[4] G09B 9/00**
**U.S. Cl. 434—247** **10 Claims**



1. An apparatus for simulating the different paces of a horse and the aids to be applied for the purpose of controlling the horse, wherein said apparatus includes a display panel provided with:

on the one hand four representative display lamps which are intended to light-up so as to represent the precise time-duration of the instant of ground contact of the different hooves of a horse and are supplied by four separate circuits in dependence on one or a number of control devices which are capable of ensuring different lighting-up recurrence rates and sequences so as to reproduce different types of paces of a horse (walk, trot, canter, gallop, etc.);

on the other hand a signal lamp which is intended to light-up so as to represent predetermined aids for controlling a horse, said signal lamp being connected into a circuit which includes an operating key at the user's disposal and the arrangement of which is such that closing of said circuit has the effect both of turning-on the signal lamp and blocking the circuits of the representative display lamps in their state of operation at that instant.

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**4,713,011**

## SOLAR SYSTEM SIMULATOR

**Fahad A. Alnafissa, 2407 Wilshire Blvd. #4, Santa Monica, Calif. 90403**

**Filed Dec. 12, 1986, Ser. No. 941,726**
**Int. Cl.[4] G09B 27/02**
**U.S. Cl. 434—292** **13 Claims**

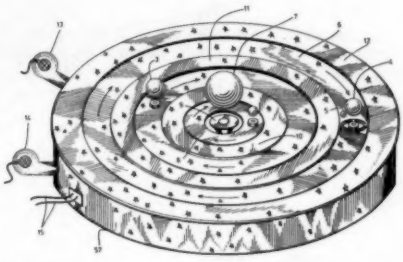
1. Apparatus for displaying a representation of the solar system, and particularly the inner planets and the Sun, the apparatus comprising:

(a) a model Earth globe and a model Moon globe;

(b) an Earth-ring assembly having an annular shape, said Earth-ring assembly comprising two structures: a rotating Earth-ring and a first ring-base assembly which is stationary; said rotating Earth-ring providing support for said model Earth and Moon globes, orbiting a model of the Sun; said first ring-base assembly providing support for said Earth-ring, and the structure for delivering forced air through nozzles to said model Earth and Moon globes, supporting them in the air;

(c) a model Venus globe and a model Mercury globe;

(d) a Venus-ring assembly, identical in shape, structure and composition to said Earth-ring assembly, except that said Venus-ring assembly is proportionally smaller in diameter than said Earth-ring assembly, and does not include an Earth-Moon support system; said Venus-ring assembly providing the mechanism for supporting said Venus globe in air, orbiting a model Sun globe;



(e) a Mercury-ring assembly, identical in shape, structure and composition to said Venus-ring assembly, except that said Mercury-ring assembly is proportionally smaller in diameter than said Venus-ring assembly; said Mercury-ring assembly providing the mechanism for supporting a Mercury globe in air, orbiting a model Sun globe;

(f) a model Sun globe;

(g) a solar pedestal for supporting said Sun globe in air;

(h) means for driving said rotating Earth-ring, rotating Venus-ring and rotating Mercury-ring; and

(i) means for providing a sufficient volume of high velocity air to each said ring-base assembly and to said solar pedestal, for the purpose of supporting each said model globe.

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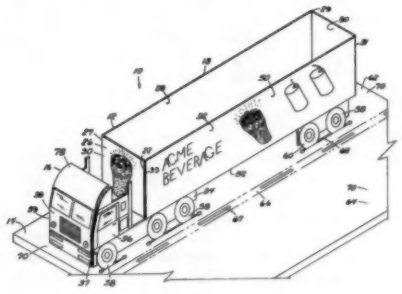
**4,713,012**

## PORTABLE DEVICE FOR MODELING VEHICLE GRAPHICS

**Judith A. Poplawski, and David J. Andersen, both of Racine, Wis., assignors to Color Arts, Inc., Racine, Wis.**

**Filed Apr. 17, 1986, Ser. No. 853,188**
**Int. Cl.[4] G09B 25/00**
**U.S. Cl. 434—373** **20 Claims**




1. A portable device for modeling of vehicle graphics comprising:

first and second flat opposite side panels each forming a side profile of the vehicle;

at least two flat cross panels extending between the first and second side panels, including a front panel forming a front profile of the vehicle and a back panel forming a back profile of the vehicle.

means hinging the cross panels to the first and second side panels whereby the panels are erectable to a three-dimensional vehicle model and collapsible to a flat stack, each of said panels having a first edge; and

means along at least some of the first edges of the panels for removably securing graphics sheets against the panels.

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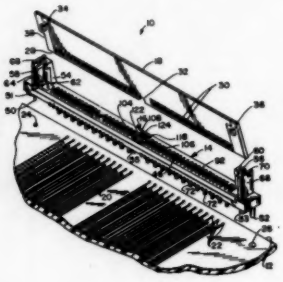
**4,713,013**

## COMPLIANT HIGH DENSITY EDGE CARD CONNECTOR WITH CONTACT LOCATING FEATURES

**Kent E. Regnier, Lombard; Thomas C. Hoover, Lisle, and Alan S. Walse, LaGrange, all of Ill., assignors to Molex Incorporated, Lisle, Ill.**

**Filed Jan. 30, 1987, Ser. No. 9,415**
**Int. Cl.[4] H01R** *9/09*
**U.S. Cl. 439—62** **10 Claims**



1. In an arrangement for electrically connecting closely-spaced circuit elements disposed on two printed circuit boards, said arrangement including:

a first printed circuit board; and

a second printed circuit board having a mating edge and a surface with a linear array of aligned contact pads adjacent said edge;

a connector including an elongated dielectric housing with a cavity formed along its length with an opening for receiving said second printed circuit board mating edge and a plurality of terminals mounted in the housing to form a closelyspaced linear terminal array, each terminal adapted to engage a contact pad when the second printed circuit board is inserted into the cavity through said opening; and

means for mounting the connector to said first printed circuit board;

the improvement comprising:

a pitch-controlling contact locator means cooperating between said mating edge and said connector, said contact locator means including:

a resilient supported spring member disposed in said connector cavity generally at the midpoint of said terminal array, said spring member being resilient in a vertical direction and substantially rigid in a horizontal direction; and

a mating cutout disposed in said mating edge generally at the midpoint of the array of contact pads and adapted to engage said spring member with two points of contact when the second printed circuit board is inserted into said cavity;

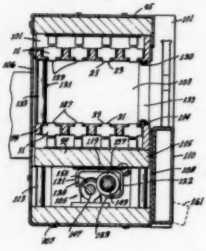
whereby a connector arrangement exhibiting corrective compliance for circuit to terminal mating misalignments introduced by dimensional tolerances and board warpage is provided.

**4,713,014**

## QUICK-RELEASE MULTI-MODULE TERMINATING ASSEMBLY

**Theodore R. Conroy-Wass, Colton, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Dec. 23, 1986, Ser. No. 946,551**
**Int. Cl.[4] H01R** *9/07, 13/631*
**U.S. Cl. 439—67** **51 Claims**



45. A panel receiver for receiving a cartridge assembly and coupling the cartridge assembly to a test device wherein the cartridge assembly has a plurality of contacts, said panel receiver comprising:

a supporting structure;

a table;

means on the supporting structure for defining a compression member;

means for mounting the table on the supporting structure for movement toward and away from the compression member between extended and retracted positions, said table being closer to said compression member in said extended position than in said retracted position;

means defining an array of exposed contacts carried by at least one of the compression member and the table;

said panel receiver having a cartridge assembly receiving space between the compression member and the table for receiving the cartridge assembly when the table is in the retracted position whereby the contacts on the cartridge assembly can be in confronting relationhip with said array of contacts;

means for moving the table from the retracted position to the extended position, whereby the contacts of the cartridge assembly can be brought into engagement with said array of contacts;

first and second elevators; and

means for mounting the first and second elevators on the supporting structure at opposite ends of the cartridge receiving space for movement in the same general direction as the table moves in moving between the extended and retracted positions, said elevators having means thereon for supporting the cartridge assembly thereon and being drivable with the table only after the table has moved a certain distance toward its extended position.

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**4,713,015**

## CONNECTING STRUCTURE FOR HIGH VOLTAGE RESISTANCE WIRES

**Isao Takiguchi, Gotenba, Japan, assignor to Yazaki Corporation, Japan**

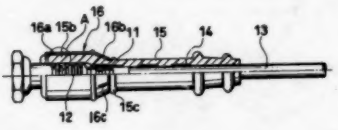
**Filed Jul. 11, 1986, Ser. No. 884,605**
**Claims priority, application Japan, Jul. 12, 1985, 60-105491**
**Int. Cl.[4] H01R** *13/516*
**U.S. Cl. 439—125** **15 Claims**

1. A connecting structure for high voltage resistance wire, comprising:

a high voltage resistance wire for suppressing noise which has on one end a connecting terminal fitted to a high voltage terminal that has a cylindrical insulator on its circumference;

an insulating soft elastic cap mounted on said high voltage resistance wire enclosing said connecting terminal which is fitted to said high voltage terminal, said cap further being fitted to the cylindrical insulator of the high voltage terminal; and

a rigid holder having means for increasing fitting strength of




said cap to the cylindrical insulator and sealing efficiency between said cap and insulator, said holder being inserted onto the outside of said elastic cap from the side of the resistance wire toward the side of the cylindrical insulator, which can be fitted closely to the outer periphery of the connecting portion of the elastic cap and the cylindrical insulator.

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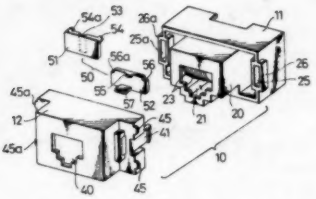
**4,713,016**

## JACK FOR TELEPHONE SET

**Yutaka Kato, Mie, Japan, assignor to Matsushita Electric Works, Ltd., Osaka, Japan**

**Filed Jan. 9, 1987, Ser. No. 1,863**
**Claims priority, application Japan, Jan. 27, 1986, 61-15006**
**Int. Cl.[4] H01R *13/44***
**U.S. Cl. 439—137** **5 Claims**




1. A jack for a telephone set comprising a casing having an aperture for receiving a cord plug of said telephone set and a dust-proof closure unit provided to be shiftable along said plug receiving aperture within said casing for opening and closing the aperture, wherein said closure unit including a pair of cover plates slidable relative to each other, said first plate having a guide groove extended in slidable direction, said second plate having a projection engageable in said guide groove of the first plate, and one of the first and second plates being provided with an operating portion projected out of said plug receiving aperture of the casing.

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**4,713,017**

## ELECTRICAL POWER RECEPTACLE

**Dominic Pesapane, West Haven, Conn., assignor to Casco Products Corporation, Bridgeport, Conn.**

**Filed Oct. 10, 1986, Ser. No. 917,701**
**Int. Cl.[4] H01R *13/44***
**U.S. Cl. 439—142** **23 Claims**

1. An electrical power receptacle comprising, in combination:

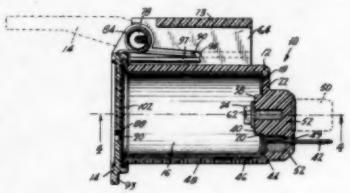
(a) a tubular plastic housing having at one end a transverse end wall, the other end of the housing being open to receive an electric plug,

(b) a tubular metal well which is fitted in said plastic housing, said well having at its inner end a transverse end wall adjacent the end wall of the housing,

(c) cooperable means on said end walls for securing the same together to thereby secure the well in said housing,

(d) a pair of terminals mounted in the end wall of the housing and projecting from the exterior thereof, one of said terminals being electrically connected to said metal well,

(e) an internal contact member on the interior of the housing end wall, connected to the other of said terminals,



(f) said housing having a pair of integral spaced-apart standoff legs extending laterally from its exterior and respectively provided with integral mounting feet,

(g) a cover plate for closing the open end of the housing, and

(h) means pivotally mounting said cover plate on said standoff legs for pivotal movement between a closed position wherein it covers the open end of the housing and an open position wherein it uncovers the said open end.

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**4,713,018**

## SLIDING CURRENT INTERCHANGE

**Quinten H. Sutton, Waukesha, Wis., assignor to RTE Corporation, Waukesha, Wis.**

**Filed Apr. 24, 1987, Ser. No. 41,959**
**Int. Cl.[4] H01R *13/53***
**U.S. Cl. 439—185** **7 Claims**

1. An electrical device comprising

a housing having a passage including an electrically conductive surface fixedly secured within said housing, and

a contact assembly disposed in said passage and movable relative to said housing conductive surface, and including

a member having a conductive surface, and

one of said housing conductive surface and said member conductive surface having a knurl in contact with said other of said housing conductive surface and said member conductive surface so that there is continuous electrical continuity between said contact assembly and said housing conductive surface.

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**4,713,019**

## SOCKETS FOR COMPACT FLUORESCENT LAMPS

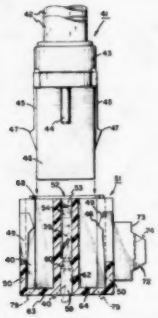
**Edwin Gaynor, 688 Hulls Farm Rd., Southport, Conn. 06490**

**Filed Sep. 17, 1986, Ser. No. 908,193**
**Int. Cl.[4] H01R *4/24***
**U.S. Cl. 439—232** **16 Claims**

1. A socket for a compact fluorescent lamp which includes two or more parallel tubes that share a common base, said base including at least two terminal pins and at least one laterally extending retaining hook, said socket having an open front lamp-receiving recess and a back end, and further comprising:

a housing having a back wall, with first, second, third and

fourth joined side walls, each joined at one end to the back wall, said side walls defining a front opening at their other front end for receiving the lamp base, said first and third walls and said second and fourth walls being in opposition to one another, and defining with said back wall the lamp-receiving recess,



a portion of said first wall comprising an integral resilient flange having an inward facing hook, shaped and aligned for establishing reversible locking engagement with said base retaining hook when the lamp base is inserted into the housing recess,

and channel means formed in said housing enclosing conductive terminal means for receiving each of said terminal pins in electrically conductive engagement.

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**4,713,020**

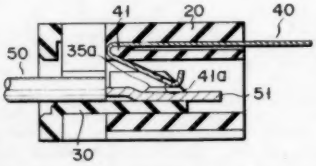
**CONNECTOR UNIT**

**Yoshiyuki Awano, Kawasaki, and Hiroshi Narita, Tokyo, both of Japan, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jan. 29, 1987, Ser. No. 8,272**

**Int. Cl.[4] H01R** *9/07*

**U.S. Cl. 439—267** **1 Claim**




1. A connector unit comprising:

a housing having an opening and connection terminal arranged in the opening, and

a movable member made of an insulating material and adapted to be inserted into the opening of the housing, in which

said connection terminal has an elastic contact portion to be brought into contact with a corresponding conductor in a direction perpendicular to that in which said conductor is inserted into the opening of the housing, and

said movable member has cam projections extending in a direction from that end of the movable member at which the movable member is inserted into the housing, to the other end of said movable member, the dimensions and position of the cam projection being so selected that, when the movable member is partially inserted into the opening of the housing, the cam projection presses the elastic contact portion to provide such a clearance as to allow the conductor to be inserted there and, with the movable member in a fully inserted position, the pressing of the elastic contact portion by the cam projection is released to allow the conductor to be electrically connected to the elastic contact portion.

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**4,713,021**

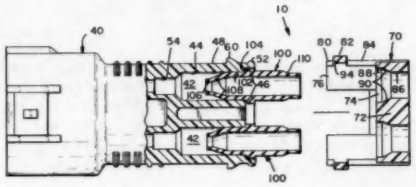
**SEALED ELECTRICAL CONNECTOR AND METHOD OF USING SAME**

**Robert J. Kobler, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed May 17, 1985, Ser. No. 735,416**

**Int. Cl.[4] H01R** *13/52*

**U.S. Cl. 439—272** **17 Claims**




1. A sealed connector assembly for receiving insertably thereinto and securing therewith electrical conductors having terminals terminated on ends thereof, comprising:

housing means, a rigid camming member secured to a rearward end of said housing means, and a plurality of individual wire seal members secured therebetween, defining a preassembled connector assembly prior to insertion of terminated conductors thereinto, wherein:

said housing means having a plurality of terminal-receiving cavities extending therethrough each to receive a respective terminated electrical conductor securely thereinto;

said plurality of individual wire seal members each associated with a said terminal-receiving cavity and said respective conductor, each said wire seal member being elongated and sleeve-like of relatively incompressible, deformable elastomeric material and having a conductor-receiving aperture extending therethrough for a said respective terminated conductor, each said wire seal member adapted to receive insertably therethrough a said terminated conductor and then initially loosely surround an insulated conductor portion therewithin substantially therealong, each said wire seal member having a forward seal portion disposed and held within a rearward section of a said associated terminal-receiving cavity and at least a rearward seal portion extending rearwardly from said cavity, said wire seal members held by said housing means prior to securing said camming member thereto;

said rigid camming member securable to said housing means in a first fixed position after said wire seal members are disposed within respective said terminal-receiving cavities of said housing means, said camming member exposing said rearward seal portions of said wire seal members for receiving said terminated ends of respective said conductors thereinto, said camming member being movable relatively towards said housing means from said first position to a second position; and

each said wire seal member including a camming surface portion on a radially outward surface thereof at least proximate a rearward end thereof, and said camming member having respective rigid cooperating camming means associated with said camming surface portion of each said wire seal member, all such that when said camming member is in said first position, a said terminated end of each said conductor is insertable into and through an associated said wire seal member and the terminal terminated to said conductor is securable in said associated terminal-receiving cavity, and when said camming member is moved to said second position, said camming surface portion of each said wire seal member is engaged by a said associated rigid cooperating camming means of said cam-

ming member and placed under force directed substantially radially inwardly, and the rearward section of each said wire seal member is radially deformed thereby into sealing engagement around an insulated portion of a said respective conductor, whereby said camming member cams the plurality of said wire seal members simultaneously into sealing engagement with respective said conductors.

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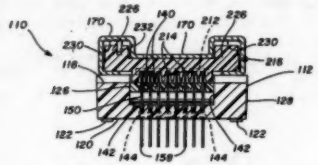
## 4,713,022
## SOCKET FOR FLAT PACK ELECTRONIC DEVICE PACKAGES

**Wayne K. Pfaff, 309 Steeplechase, Irving, Tex. 75062**

**Filed Aug. 5, 1986, Ser. No. 893,170**
**Int. Cl.[4] H01R** *9/09*
**U.S. Cl. 439—331** **5 Claims**




1. A socket for a flat pack electronic device package having a housing and plurality of ribbon leads supported in a carrier comprising:

(a) a base defining opposite upper and lower surfaces;

(b) a plurality of electrically conductive contacts mounted in said base and extending through said base from said upper surface to said lower surface, each of said contacts including a resilient upper contact point projecting from said upper surface and at least one tab projecting from said lower surface for electrical connection exteriorly of the socket;

(c) a lid pivotally connected to said base and shiftable between a loading position for receipt of a carrier supporting a flat pack electronic device package and a latched position with said lid adjacent and parallel with said upper surface with each ribbon lead of the flat pack package aligned and in contact with one of said contacts in said base, said lid defining a pair of laterally spaced channels for sliding receipt of the carrier containing the electronic device package to support the carrier from the underside thereof;

(d) latch means for releaseably securing said lid in said latched position; and

(e) means depending from said lid and cooperating with said channels to engage said carrier and thereby align each of the ribbon leads of the flat pack package with one of said contact points when said lid is in the latched position.

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## 4,713,023
## ELECTRICAL CONNECTOR AND METHOD OF ASSEMBLY

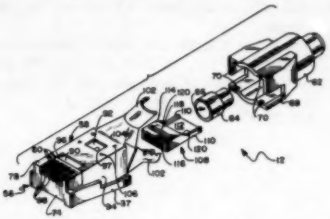
**Craig A. Bixler, Elmhurst, and Irvin R. Triner, Stickney, both of Ill., assignors to Molex Incorporated, Lisle, Ill.**

**Filed Jan. 30, 1987, Ser. No. 9,314**
**Int. Cl.[4] H01R** *4/04*
**U.S. Cl. 439—393** **19 Claims**

1. A plug assembly for connecting multiconductor cable assembly to a receptacle, said multiconductor cable assembly including a plurality of insulated conductors surrounded by an outer insulation jacket, said plug assembly being of the type including

an insulated housing having a front mating end and a rear wire receiving end joining opposing top and bottom walls and an opposing pair of side walls and further including a generally planar trough extending from a wire receiving opening in the rear end towards the front end of the housing, and a plurality of terminal receiving cavities extending from the top wall into said trough near the front end thereof and a strain relief section formed in the top wall between the terminal receiving cavities and the rear end and extending generally over the width of the trough and deformable downwardly into the trough upon receiving a downward force,

insulative wire positioning means received through the wire receiving opening into the trough and holding said insulated conductors in an array so that the ends thereof are presented in alignment below said terminal receiving



cavities when the wire loaded positioning means is in the housing trough, and

a plurality of insulation penetrating terminals mounted in the terminal receiving cavities and moveable toward the trough to engage the conductors aligned thereunder;

the improvement comprising:

said positioning means includes cam means formed thereon adapted to engage said housing strain relief section when it is moved downwardly, whereby said positioning means is moved forwardly in the trough to fully seat the positioning means therein and position the free ends of the insulated conductors below said terminals.

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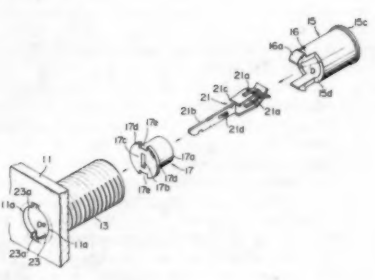
## 4,713,024
## CONNECTOR FOR TELEVISION DISTRIBUTION EQUIPMENT

**Takuya Hatakeyama, Chiba, and Shinji Ohga, Tokyo, both of Japan, assignors to Uro Denshi Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 30, 1986, Ser. No. 891,878**
**Claims priority, application Japan, Jul. 30, 1985, 60-115897**
**Int. Cl.[4] H01R** *13/73*
**U.S. Cl. 439—555** **7 Claims**



1. A connector for distribution equipment, comprising:

a cylindrical outer conductor fixed on a casing of the distribution equipment, an outer braid conductor of a coaxial cable being connectable to said outer conductor;

a substantially cylindrical insulator inserted in said outer conductor;

an inner resilient conductor member inserted and held in said insulator, an internal conductor of said coaxial cable being connectable to said inner resilient conductive member;

a plurality of projecting members extending radially inward in mutually opposed state around an opening through which a space in said casing and a space in said outer conductor communicate with each other; and

a plurality of flexible legs having respective claws formed radially outward on nose portions thereof, said legs being provided on said insulator and projecting further rearward of a rear end surface of the insulator.

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**4,713,025**

## ELECTRIC CONNECTOR FOR MULTI-CONDUCTOR FLAT CABLES

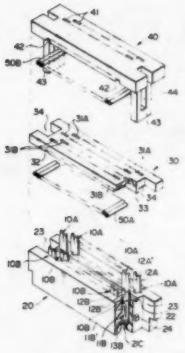
**Keiji Soma, Tokyo, Japan, assignor to Hirose Electric Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 608,101, May 8, 1984, abandoned. This application Nov. 21, 1985, Ser. No. 799,563**

**Claims priority, application Japan, Feb. 10, 1984, 59-23413**

**Int. Cl.[4] H01R** *13/502*

**U.S. Cl. 439—752** **1 Claim**



1. An electric connector for at least first and second multi-conductor flat cables having conductors therein being spaced apart a predetermined distance, said electric connector comprising:

an insulating housing having a substantially flat end face;

a plurality of first and a plurality of second contacts extending from said end face, said first contacts having a press-contact portion located at a level of height with respect to said end face different from the level of height of said second contacts, each contact having said press-contact portion and a contact part for securing said contacts in said housing;

first and second cable connecting members in the form of a substantially flat plate;

said first contacts and said second contacts extending from said end face in at least two respective rows so that all of the contacts in the same row are arranged in a uniformly staggered fashion across said end face with the contact parts of said contacts within said rows being aligned along a line and the press-contact portions of the contacts in the same row being aligned along two lines with said contact parts being located between said two lines,

a spacing between adjacent staggered press-contact portions of the contacts arranged in one row being equal to a spacing between adjacent staggered press-contact portions of the contacts arranged in another row and being equal to said predetermined distance spacing between the conductors in said multi-conductor flat cable to be connected;

said first cable connecting member having a cable receiving recess for receiving an end portion of the first multi-conductor flat cable to be connected, press-contact portion holes for receiving the press-contact portions of the first contacts, and press-contact portion passing holes for passing the press-contact portions of the second contacts, the first cable connecting member being able to be coupled to said end face of said insulating housing;

said second cable connecting member having a cable receiving recess for receiving an end portion of the second multi-conductor flat cable to be connected, and press-contact portion holes for receiving the press-contact portions of the second contacts protruding from the substantially flat plate face of the first cable connecting member coupled to said insulating housing, the second cable connecting member being able to be coupled to the first cable connecting member for stacking on said substantially flat plate face of the first cable connecting member.

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**4,713,026**

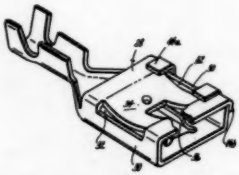
## TAB RECEPTACLE TERMINAL HAVING IMPROVED ELECTRICAL AND MECHANICAL FEATURES

**Dewey F. Mobley, Lake Orion; Janice M. Warren, New Hudson; August Barbrick, Plymouth, all of Mich., and Gregg A. Eisenmann, Parma, Ohio, assignors to Interlock Corporation, Westland, Mich.**

**Filed Oct. 8, 1986, Ser. No. 916,950**

**Int. Cl.[4] H01R** *13/11*

**U.S. Cl. 439—845** **9 Claims**



1. A tab receptacle terminal fabricated by bending a single sheet of material comprising:

a rectangular receptacle box having a closed continuous wall forming an end opening through which a male terminal is inserted so as to make contact with said receptacle box, said receptacle box including a bottom, a top, and sides,

single leaf spring means formed in said top so as to extend across substantially the entire width of said top between said sides, and extending toward said bottom for engagement with a male terminal inserted therebetween to achieve high retention forces,

closed slots extending lengthwise along the juncture of said top with said sides to enable deflection of said leaf spring means,

and fixed beams formed on said bottom and extending toward said leaf spring means for engagement with a male terminal with normal force applied by said leaf spring means toward said fixed beams.

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**4,713,027**

## RINGED IMPELLER FOR A WATER JET DRIVE

**Ronald B. Fowler, 1991 Main St., Sarasota, Fla. 33577**

**Filed Apr. 15, 1987, Ser. No. 38,714**

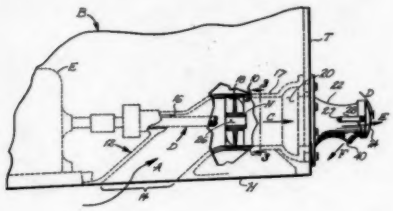
**Int. Cl.[4] B63H** *11/103*

**U.S. Cl. 440—47** **7 Claims**

1. In a water jet drive for a boat having a bottom, a transom, and a motor for providing rotational output through an output shaft, the water jet driven having a housing with a water inlet and a water outlet, the inlet disposed through the boat bottom allowing water to flow into the housing, said outlet disposed through the boat transom allowing water to be pumped out of the housing to propel the boat, a rigid motor driven impeller having blades and mounted on the rotatable output shaft, the impeller positioned within the housing to forcably urge and accelerate water entering the housing inlet out through the

housing outlet for propelling the boat, the improvement comprising:

an annular ring connected to and between the distal ends of the impeller blades;



said ring having a generally circular outer surface concentric with the output shaft and fitted in close proximity within a mating circular surface in the housing; and

a plurality of apertures through said annular ring for flushing debris from between said annular ring and the mating surface in the housing.

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**4,713,028**

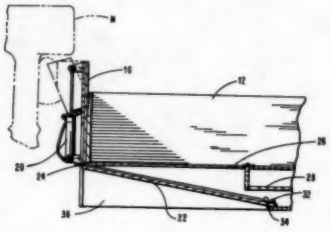
## SHALLOW WATER BOAT DESIGN

**Don Duff, P.O. Box 246, Chavies, Ky. 41717**

**Filed Jun. 19, 1986, Ser. No. 875,921**

**Int. Cl.[4] B63H** *5/12*

**U.S. Cl. 440—61** **14 Claims**



**1**. A boat allowing full operation in shallow water utilizing an outboard motor with propeller and cooling water intake port, comprising:

a main hull;

a displaceable transom of said main hull supporting said motor to be lowered for normal operation and raised for shallow water operation;

a displaceable hull section; and

means for pivotally connecting said displaceable hull section to said displaceable transom so as to follow the movement thereof;

whereby raising said displaceable transom serves to raise said motor and prevent damage to said propeller as well as raise said displaceable hull section so as to provide a flow channel for directing water to the propeller and intake port of the motor for proper and efficient cooling.

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**4,713,029**

## INVERTED FLOW MARINE ENGINE EXHAUST MUFFLER

**John R. Ford, Xenia, Ohio, assignor to Vernay Laboratories, Inc., Yellow Springs, Ohio**

**Filed Feb. 17, 1987, Ser. No. 15,415**

**Int. Cl.[4] F01N** *1/14;* **B63H** *21/32*

**U.S. Cl. 440—89** **7 Claims**

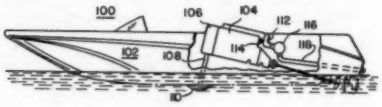
**1**. An exhaust muffler for a marine engine comprising:

a muffler main body chamber;

inlet means for carrying a combination of exhaust gases and cooling fluid from the exhaust of a marine engine into said chamber;

first tubular means having a lower end sealingly extended through the bottom of said chamber and an upper end extending upwardly within said chamber in a generally vertical orientation for carrying a combination of exhaust gases and cooling fluid from said chamber downwardly through said first tubular means;

second tubular means surrounding and spaced from said first tubular means for forming a passage therebetween, said second tubular means having its upper end substantially adjacent the upper end of said first tubular means and its lower end extending to a point below said inlet means and spaced from the bottom of said chamber; and



cap means sealing the upper end of said second tubular means for inverting the flow of exhaust gases and cooling fluid from said passage defined between said first and second tubular means into said first tubular means whereby as the cooling fluid accumulates on the bottom of said chamber and rises toward the lower end of said second tubular means, and hence, said passage, a pressure differential is set up between said chamber and the exhaust path defined by said passage, said cap means and said first tubular means such that the combustion gases carry portions of the cooling fluid upwardly to the top of the passage whereat they are diverted downwardly into said first tubular means by said cap means and discharged from said chamber through said first tubular means.

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**4,713,030**

## MARINE CRAFT

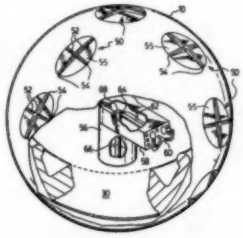
**John W. Ingle, 85 Cynthia Road, Toronto, Ontario, Canada M6N 2P8**

**Continuation-in-part of Ser. No. 598,980, Apr. 11, 1984, which is a continuation of Ser. No. 744,527 Jun. 14, 1985 abandoned.**

**Filed Jan. 22, 1987, Ser. No. 8,146**

**Int. Cl.[4] B63H** *1/38*

**U.S. Cl. 440—99** **5 Claims**



**1**. A marine craft comprising:

an outer hull of completely spherical shape;

an inner load-carrying structure of hemispherical shape;

universal bearing means between said inner structure and said outer hull supporting said inner structure within said outer hull and permitting universal movement of said inner structure relative to said outer hull;

mass means in said inner structure, biasing the same into a predetermined reference position;

drive motor means on said inner structure, engageable with and disengageable from said outer hull, whereby said outer hull may be rotated relative to said inner hull about

a selected diametric axis of said inner structure, and means for operating said drive motor means;

a plurality of groups of fins on the exterior of said outer hull, each of said groups comprising four planar fins each said fin defining a root and a tip and tapering from said root to said tip, said four fins in each said group joining one another at their roots at a central junction in a generally cruciform configuration and extending radially away from said central junction, with adjacent said fins in said group being arranged at right angles to one another, said groups of fins being located at spaced apart positions over said outer hull, said fins being disposed in planes which include diametric axes of said outer hull whereby rotation of said outer hull about any selected diametric axis may cause some said fins to engage the water and procure propulsion of said craft along the surface of the water.

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**4,713,031**

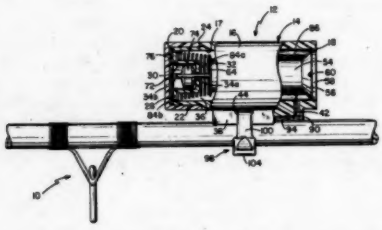
**SUBMERGED BOBBER RELEASE DEVICE FOR FISHING RODS AND THE LIKE**

**Kevin S. Fuller, 3418 Greenbrier, Vadnais Heights, Minn. 55110**

**Filed Jun. 20, 1986, Ser. No. 876,773**

**Int. Cl.[4] B63B *22/10***

**U.S. Cl. 441—8** **14 Claims**



1. A device for enabling the retrieving of a submerged fishing rod or the like comprising a tubular housing having a cylindrical bore open at one end and closed at its other end, means within said other end for containing a water-soluble element therein, a bobber releasably confined within said housing having a tongue projecting from one end thereof, said bobber having an enlarged end at each end thereof substantially occupying said bore and having notches therein to facilitate the passage of water when said device becomes submerged, said element-containing means having a slot therein so that said tongue extends through said slot for retention by said water-soluble element until said element is dissolved.

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**4,713,032**

**SAILBOARDS AND SURFBOARDS AS WELL AS MANUFACTURING PROCESS THEREOF**

**Wolfgang Frank, Bruckmühl, Fed. Rep. of Germany, assignor to TAA Technique and Administration AG, Basel, Switzerland**

**PCT No. PCT/EP84/00240, § 371 Date Apr. 12, 1985, § 102(e) Date Apr. 12, 1985, PCT Pub. No. WO85/00755, PCT Pub. Date Feb. 28, 1985**

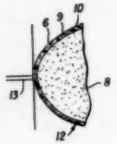
**PCT Filed Aug. 9, 1984, Ser. No. 723,959**

**Claims priority, application Fed. Rep. of Germany, Aug. 12, 1983, 3329230**

**Int. Cl.[4] A63C *15/05***

**U.S. Cl. 441—74** **5 Claims**

1. A sailboard or surfboard comprising a foam core and a shell of fiber-reinforced synthetic resin and a surface layer, characterized in that polyurethane resin is provided as synthetic resin and said surface layer is an intimately adhering deep drawn thermoplastic film with a thickness of 0.1 to 0.5



mm applied during the preparation of said sailboard or surfboard.

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**4,713,033**

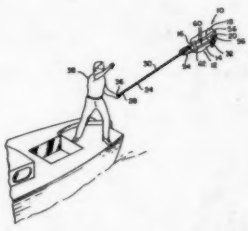
**LINE THROW-BAG**

**Robert W. Cameron, 7724 115th Pl. NE., Kirkland, Wash. 98033**

**Filed Mar. 19, 1986, Ser. No. 841,957**

**Int. Cl.[4] B63C *9/26***

**U.S. Cl. 441—84** **49 Claims**



1. A line throw-bag for water rescue, comprising:

a bag colored for high visibility manufactured of a water resistant material, said bag having a pliable and generally cylindrical sidewall with sufficient stiffness to maintain an at least partially uncollapsed shape when under its own weight, said bag further having an open end, a closed end formed by an end wall with a central aperture, and an interior compartment with sufficient size to loosely receive and store therein a length of line, said line having first and second end portions with a lengthy central portion therebetween, said first line end portion extending through said end wall aperture and having a loop positioned exterior of said bag and sized for grasping by the person to be rescued, said first line end portion further having a pair of knots, one of said knots being positioned to each side of said end wall aperture and said end wall aperture being sized to prevent passage of said knots therethrough, said central line portion being storable in a plurality of folds within said bag compartment, said second line end portion extending through said bag open end and having a loop positioned exterior of said bag and sized for grasping by the person throwing said bag, whereby said line gradually plays out of said bag through said bag open end as said bag travels forward when thrown with said second line end portion loop being held stationary;

an annular weighted member fixedly attached to said bag end wall with a central opening generally concentric with said end wall aperture, said weighted member having sufficient weight in combination with the weight of said bag to carry said bag forward when forwardly thrown for a distance substantially equal to the length of said line central portion and to gradually play said line out of said bag under the rearward drag created by holding said second line end portion loop stationary while said line plays out, said weighted member having sufficient weight

to cause said bag to land with said bag end wall downward when thrown;

an annular disc-shaped flotation member fixedly attached to said bag end wall and having a central opening generally concentric with said end wall aperture, said flotation member having sufficient buoyancy to keep said bag afloat in water in a generally upright position with said bag sidewall extending upward above the water level for visibility; and

a pair of handles fixedly attached to said bag and extendable beyond said bag open end, said handles being sized for releasable grasping by the person throwing said bag, each of said handles being attached to said bag sidewall at generally diametrically opposing positions.

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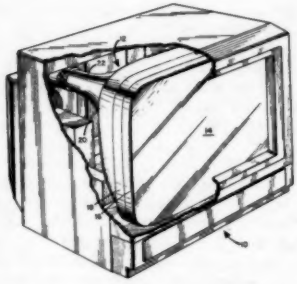
**4,713,034**

## MEANS AND METHOD FOR MANUFACTURE OF A HIGH-RESOLUTION COLOR CATHODE RAY TUBE

**Sae D. Lee, Buffalo Grove, and Kazimir Palac, Carpentersville, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Jul. 23, 1985, Ser. No. 758,174**
**Int. Cl.[4] H01J** *9/227, 9/40*
**U.S. Cl. 445—45** **10 Claims**



1. In-process articles of manufacture for the manufacture of a high-resolution color cathode ray tube having a tensed foil shadow mask, a first in-process article comprising a faceplate with a target area for receiving at least one pattern of phosphor deposits, said faceplate having attached at preselected, widely spaced locations on the sides thereof a plurality of discrete, detachable first indexing elements, and a second in-process article comprising a shadow mask support assembly having a frame ultimately constituting a part of the tube envelope for supporting said shadow mask in precise adjacency to said target area, said frame having attached on the sides thereof a like plurality of discrete, detachable second indexing elements which are in facing adjacency to said first indexing elements on said faceplate when the faceplate and frame are mated, said indexing elements being detachably attached by a thermally degradable cement compounded to degrade at the final assembly frit-seal temperature, whereby said faceplate and said frame can be inter-registered in precise relationship by the temporary use of said first and second indexing elements in the process of screening said pattern of phosphor deposits on said target area and later in the final assembly of said tube.

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**4,713,035**

## TOY TELEPHONE

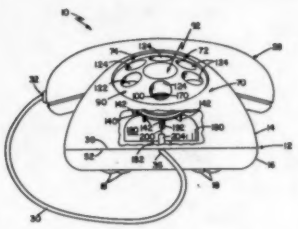
**Paul Thom, Woburn, Mass., assignor to Kiddie Products, Inc., Avon, Mass.**

**Filed Aug. 20, 1986, Ser. No. 898,330**
**Int. Cl.[4] A63H** *33/30*
**U.S. Cl. 446—141** **13 Claims**

1. A toy telephone comprising a base, a dial connected to said base and having a rotary surface and noise generating means within said base actuable by said dial,

characterized in that

said dial is connected to said base for both rotary and axial motion relative to said base and



said noise generating means within said base is actuable to generate one noise upon rotary actuation of said dial, and said noise generating means within said base is actuatable to generate a different noise upon axial actuation of the rotary surface of said dial.

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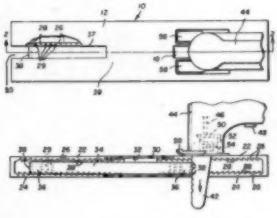
**4,713,036**

## TOY SIMULATOR POWER DRIVEN RECIPROCATING SAW WORKSHOP

**David E. Moomaw, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.**

**Filed Oct. 27, 1986, Ser. No. 923,631**
**Int. Cl.[4] A63H** *33/30*
**U.S. Cl. 446—145** **9 Claims**



1. A toy simulated power driven reciprocating saw workshop for simulating the sawing action of a real power driven reciprocating saw cutting a groove through a board, comprising:

saw means;

means defining an elongated slot extending therethrough;

bar means;

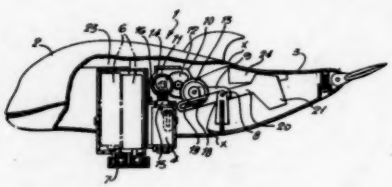
means for supporting the bar means within the slot substantially parallel thereto; and

escapement means between the bar means and the slot defining means adapted when the bar means is reciprocated and pressed forwardly along the slot to intermittently move the bar means in steps along the slot by said saw means simulating the movement of a real power driven reciprocating saw cutting a groove through a board.

## 4,713,037
## SWIMMING MARINE CREATURE TOYS

**Duncan Tong, Hong Kong, Hong Kong, assignor to Duncan Products Ltd., Hong Kong, Hong Kong**

**Filed Aug. 8, 1986, Ser. No. 894,991**
**Claims priority, application United Kingdom, Sep. 10, 1985, 8522372; Dec. 31, 1985, 8531942**
**Int. Cl.[4] A63H** *23/10*
**U.S. Cl. 446—158** **6 Claims**



1. A toy simulating a marine creature which comprises a body portion and a tail portion with a tail fin pivotally mounted thereto; a battery operated motor housed in said body portion and arranged to move said tail and said tail fin relative to said body portion to propel said toy through the water; a drive means to drive said tail portion comprising a pair of cranks mounted parallely and directly opposite one another on a single spindle and driven through gearing by said motor; and a drive member extending down within the top portion of said tail, said drive member being provided with a pair of slots, each slot receiving a pin connected to one of said cranks.

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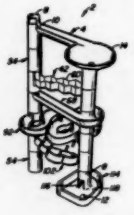
## 4,713,038
## MARBLE RACE GAME

**William J. Wichman, Glendora, Calif., and Edward M. Troup, deceased, late of Mount Baldy, Calif. (by Cathryn H. Troup, executor), assignors to Discovery Toys, Inc., Pleasant Hill, Calif.**

**Filed Jul. 5, 1985, Ser. No. 752,420**
**Int. Cl.[4] A63H** *29/08*
**U.S. Cl. 446—168** **17 Claims**



1. A modular marble race game made of a number of marble race toys comprising:

entrance columns each having upper and lower ends, a top entrance at the entrance column upper end and a side exit;

exit columns each having upper and lower ends, a side entrance and a bottom exit at the exit column lower end, the side exit positioned at a higher elevation than the side entrance;

the upper ends of the entrance and exit columns of one of said toys sized for mating engagement with the respective lower ends of the exit and entrance column of another of said toys;

a zig-zag channel connecting the side exit of a first entrance column with the side entrance of a first exit column to constitute a zig-zag toy, the channel including a number of channel segments positioned at angles to adjacent channel segments to define a zig-zag marble path;

a J-channel connecting the side exit of a second entrance column with the side entrance of a second exit column to constitute a J-channel toy, the J-channel including a first, elongate portion extending from the second entrance column side exit and a second, spiral portion circumscribing a substantial portion of the second exit column and opening into its side entrance;

a paddle wheel channel connecting the side exit of a third entrance column with the side entrance of a third exit column;

a rotatable paddle wheel mounted to the paddle wheel channel to constitute a paddle wheel toy, the paddle wheel having an outer surface positioned adjacent a portion of the paddle wheel channel to engage the marble as the marble rolls along the paddle wheel channel to rotate the paddle wheel, the outer paddle wheel surface having a scalloped shape;

a serpentine channel connecting the side exit of a fourth entrance column and the side entrance of a fourth exit column to constitute a serpentine channel toy, the serpentine channel including a plurality of alternating right and left helical segments defining arcs of substantially greater than 180° while maintaining a generally constant downward slope;

a wide, pin-deflect channel connecting the side exit of a fifth entrance column and the side entrance of a fifth exit column constituting a pin-deflect toy, the pin-deflect channel having a bottom, a sidewall and a plurality of upwardly extending pins mounted to the bottom, a first bottom portion at the fifth entrance column side exit and a second, laterally contracting bottom portion at the fifth exit column side entrance, at least a portion of the sidewall having an irregular inner sidewall surface to deflect the marble away from the sidewall as the marble rolls along the channel;

a funnel member having a sidewall defining an inwardly and downwardly tapering inner funnel surface extending between an upper rim and a lower funnel end, the lower funnel end being at a downwardly opening funnel exit, the sidewall having a funnel entrance towards the upper rim;

a funnel toy channel connecting the side exit of a sixth entrance column to the funnel entrance to constitute a funnel toy, the funnel toy channel defining a generally tangential funnel entrance path along which the marble rolls as it enters the funnel; and

the lower funnel end of the funnel member sized for mating engagement with upper ends of the entrance columns of at least one other of said toys.

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## 4,713,039
## GYROSCOPIC TOY

**Raymond Wong, Union City, Calif., assignor to Wong & Bibaoco, Union City, Calif.**

**Filed Sep. 19, 1986, Ser. No. 909,170**
**Int. Cl.[4] A63H** *33/26*
**U.S. Cl. 446—233** **6 Claims**

1. An electrically rotated toy top comprising:

a tubular first housing;

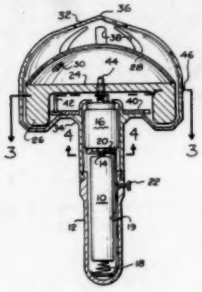
an electric motor within said first housing, said motor having an extending rotatable shaft coaxial with said tubular first housing;

a battery within said tubular first housing, said battery having a first terminal in contact with a first motor terminal and a second terminal in contact with a second motor terminal through a momentary contact electrical switch;

a rotatable flywheel coupled to said motor shaft, said flywheel including an overlying hollow dome with a small opening therein;

a second housing, said second housing including a second hollow dome closely overlying the hollow dome on said rotatable flywheel, said second hollow dome having a plurality of openings to form first sound generating means upon relative rotation between said hollow domes; and

second sound generating means including a multiple spoked non-rotatable disc centered around the shaft end of said



motor and a resilient member coupled to said rotatable flywheel and extending into the spokes of said disc.

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**4,713,040**

## TORQUE TRANSMISSION ASSEMBLY WITH ENHANCED TORQUE TRANSMITTING CHARACTERISTICS

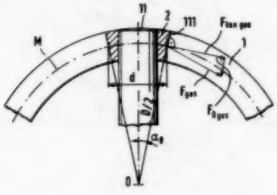
**Wolfgang Beigang, and Werner Hoffman, both of Siegburg, Fed. Rep. of Germany, assignors to Uni-Cardan Aktiengesellschaft**

**Filed Oct. 20, 1986, Ser. No. 922,039**

**Claims priority, application Fed. Rep. of Germany, Nov. 7, 1985, 3539447**

**Int. Cl.[4] F16D *3/40***

**U.S. Cl. 464—132** **8 Claims**



1. In a shaft assembly for transmitting torque including a fiber-reinforced composite shaft member having a tubular configuration with a tube wall having radial bores through at least one end thereof and bushes inserted into said bores, with said bushes being provided with recesses which may receive therein joint journals having a longitudinal axis arranged radially in said shaft member for the purpose of introducing torque, with tangential and radial forces occurring at a transmitting face of said tube wall, the improvement comprising that said bushes are formed as truncated cones tapered towards an interior of said shaft member with a cone angle $\alpha$ selected such that a radial component of forces to be transmitted is minimized or eliminated.

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**4,713,041**

## NON-LUBRICATED DRIVE BELT SYSTEM FOR A CONTINUALLY VARIABLE TRANSMISSION

**Thomas R. Stockton, Ann Arbor, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Sep. 15, 1986, Ser. No. 907,273**

**Int. Cl.[4] F16H *11/04***

**U.S. Cl. 474—28** **8 Claims**

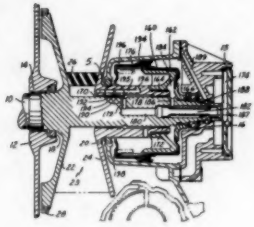
1. A transmission for an automotive driveline connected to an engine for shifting continually among drive ratios comprising input pulley means driveably connected to the engine for engagement driveably by a drive belt at a continually variable radial distance from the axis of the engine shaft including:

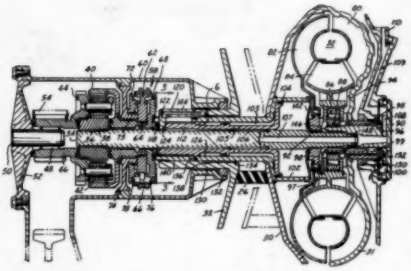
a first sheave fixed against displacement and supported for rotation with the engine shaft;

a second sheave longitudinally displaceable with respect to the first sheave and supported for rotation with the engine shaft;

a hydraulic cylinder fixed for rotation with the engine shaft;

a piston displaceable within the cylinder and connected to the second sheave, defining in the cylinder a first variable





volume connectable to a source of pressurized hydraulic fluid and a second variable volume connectable to a source of relatively low pressure fluid;

first dry bushing means for rotatably supporting the second sheave; and

hydraulic sealing means for sealing against the flow of hydraulic fluid toward the dry bushing including first and second hydraulic seals spaced from one another along the axis of the engine shaft and first passage means for carrying hydraulic fluid away from the space between the first and second seals.

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**4,713,042**

## AUTOMATIC TRANSMISSION FOR A BICYCLE

**Daniel Imhoff, 334 Cross St., Battle Creek, Mich. 49017**

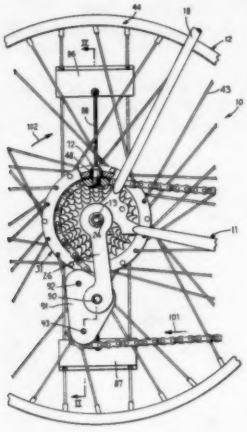
**Filed Mar. 24, 1986, Ser. No. 843,326**

**Int. Cl.[4] F16H *9/26***

**U.S. Cl. 474—69** **16 Claims**

1. A drive apparatus for a manually propelled vehicle, comprising: a wheel supported on said vehicle for rotation about an axis; a driving member which is movably supported on said vehicle and is moved in response to manually applied forces; and transmission means for drivingly coupling said driving member to said wheel, said transmission means including variable drive ratio means for varying a drive ratio at which said driving member is drivingly coupled to said wheel within a range bounded, by an upper limit and a lower limit, means responsive to the rotational speed of said wheel and operatively coupled to said variable drive ratio means for urging said variable drive ratio means to respectively decrease and increase said drive ratio in response to increases and decreases in the speed of said wheel, and means responsive to a torque

applied by said driving member to said wheel through said transmission means for resisting a decrease in said drive ratio



by said variable drive ratio means in response to an increase in the speed of said wheel.

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**4,713,043**

**CHAIN TENSIONER**

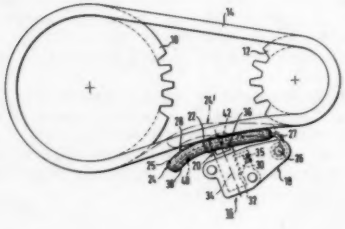
**Adam Biedermann, Puchheim, Fed. Rep. of Germany, assignor to Joh. Winklhofer & Söhne, Munich, Fed. Rep. of Germany**

**Filed Feb. 25, 1986, Ser. No. 833,346**

**Claims priority, application Fed. Rep. of Germany, Feb. 26, 1985, 3506770; Jul. 8, 1985, 3524378**

**Int. Cl.[4] F16H 7/08**

**U.S. Cl. 474—111** **18 Claims**



1. Chain tensioner comprising a housing (32'), an axially extending piston (34') displaceably guided in the axial direction of said piston in a recess in said housing (32'), an elongated tensioner bar (38') having a first end and a second end spaced apart in the elongated direction with the first end articulated to the housing (32'), said tensioner bar (38') has a first side (36') extending in the elongated direction and pressed against a piston head (42') of said piston (34') located externally of said housing (32'), said tensioner bar (38') has a second side (72') extending in the elongated direction and disposed opposite said first side (36') and said second side (72') rests against a chain (14'), and a device for lubricating the chain (14') having an oil entry aperture (48') in said first side (36') and at least one oil outlet aperture (68') in the second side (72') of said tensioner bar (38'), wherein the improvement comprises an oil feed opening (44') opening into the recess of said housing (32'), said piston (34') is a hollow piston in the axial direction forming an axially extending bore and an oil outlet opening (46') through said piston head (42') connected to said oil entry aperture (48'), said tensioner bar (38') has a passage (50') extending parallel to said second side (72'), and said passage (50') connects said oil entry aperture (48') with said at least one oil outlet aperture (68').

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**4,713,044**

**BELT TENSIONER UNIT FOR INTERNAL COMBUSTION ENGINE OR THE LIKE**

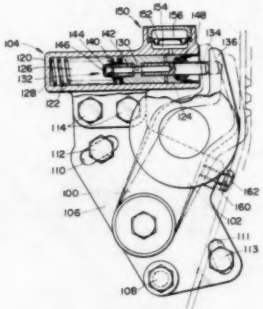
**Makoto Nakamura, Yokohama; Mitsuru Takahashi, Yamato; Namieki Osawa, and Yuichi Murakami, both of Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Sep. 8, 1986, Ser. No. 904,293**

**Claims priority, application Japan, Sep. 9, 1985, 60-137660[U]**

**Int. Cl.[4] F16H 7/12**

**U.S. Cl. 474—135** **8 Claims**



1. In a device having a belt which drivingly interconnects pulleys, a belt tensioning arrangement comprising:

a base plate pivotally mounted on said device and selectively securable in a selected position;

a support arm having first and second ends, said support arm being pivotally mounted on said base plate at a first end thereof so as to be pivotal about an axis;

an idler pulley mounted on said support arm at a location between said first and second ends, said idler pulley being engageable with said timing belt; and

a tensioner mechanism mounted on said base plate at a location distal from said axis, said tensioner mechanism including means for applying a bias to said second end of said support arm which biases said support arm in a first rotational direction which increases the force with which said pulley engages said timing belt and thus increases the tension therein.

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**4,713,045**

**AUTO-TENSIONER FOR BELT SYSTEMS AND A METHOD FOR ADJUSTING TENSION DEGREE**

**Hisashi Kodama, Nagoya, and Yoshio Okabe, Chiryu, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan**

**Filed Sep. 30, 1986, Ser. No. 913,461**

**Claims priority, application Japan, Sep. 30, 1985, 60-217518**

**Int. Cl.[4] F16H 7/12**

**U.S. Cl. 474—135** **1 Claim**

1. An auto-tensioner for belt systems, comprising:

an idler pulley for tensioning a belt and swingable around a pivotal point formed on a bracket,

an auto-tensioner body fixed firmly to said bracket and having a rod for pushing said idler pulley,

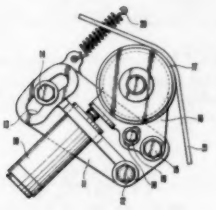
a first bolt fixed to a fast member and around which said bracket is swingable,

a second bolt inserted in a first slit-like opening formed on said bracket,

a third bolt inserted in a second slit-like opening formed on

said bracket for setting said swingable idler pulley at a desired position, and

a spring connected with said bracket for setting a starting tension degree of belt, and



said third bolt being removed or loosened after setting the starting tension degree of belt.

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**4,713,046**

## CIRCULAR MACHINE FOR AUTOMATIC MANUFACTURING OF DISPLAY BOXES

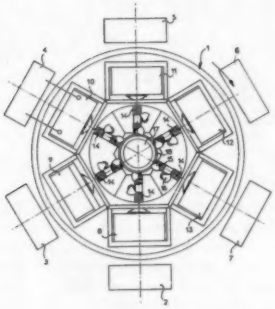
**Francois Dupuy, Dignac, France, assignor to Dupuy Engineering, S.A., L'Isle D'Espagnac, France**

**Continuation of Ser. No. 476,346, Mar. 17, 1983, abandoned. This application Feb. 13, 1987, Ser. No. 15,527**

**Claims priority, application France, Mar. 18, 1982, 82 04579; Feb. 24, 1983, 83 02985**

**Int. Cl.[4] B31B *1/60***

**U.S. Cl. 493—6** **11 Claims**



1. Apparatus for assembling paperboard and plastic blanks, particularly for making packages of the type having an opening which is closed by a stiff sheet of plastic, comprising in combination:

a horizontal table which is indexable around a vertical axis; a plurality of suction boxes adapted to receive the blanks to be assembled, means mounting said suction boxes on said table in predetermined angular positions; means for connecting each suction box to a vacuum source;

a plurality of work stations arranged around said table in predetermined spaced apart angular positions, said work stations comprising a feeding station for feeding a paperboard blank onto a suction box, a feeding station for feeding a plastic blank onto a suction box, a sealing station for sealing a plastic blank on a suction box to a paperboard blank on the same suction box, and a discharge station for removing assembled blanks for the suction boxes; and

control means for intermittently indexing said table to move said suction boxes successivley from one work station to the next and for operating each of said stations, after indexing movement of said table.

**4,713,047**

## TUBULAR BAG CLOSING MACHINE

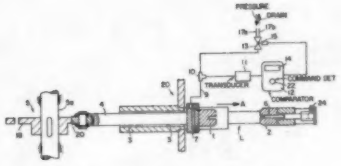
**Wolfgang Klinkel, Bigorio, Switzerland, assignor to ILAPAK Research & Development S.A., Lugano, Switzerland**

**Filed Feb. 18, 1986, Ser. No. 830,641**

**Claims priority, application Switzerland, Feb. 18, 1985, 738/85**

**Int. Cl.[4] B31B *1/00***

**U.S. Cl. 493—34** **2 Claims**



1. Tubular bag closing machine having a pair of closing jaws (1, 2) at least one jaw being relatively movable with respect to the other in a closing direction to close the jaws against each other and to seal walls of a tubular plastic element together to form a bag closure, comprising:

a mechanical drive means (5) for moving said at least one of said closing jaws over a fixed path towards the other jaw (2), said mechanical drive means including a rotary-to-linear drive sytem (5, 5*a*, 18, 20; 4), providing a fixed displacement path for said at least one closing jaw;

a pneumatic pressure element (7) pressing at least one of said closing jaws (1) against the other (2), said pneumatic pressure element (7) including a pneumatic pressure pillow or cushion (7) located between at least one of said closing jaws (1) and said rotary-to-linear drive system; and

control means for controlling the pneumatic pressure applied to the pneumatic pressure element including

command means (22) for preselecting and modifying a command value of commanded pressure;

a pressure-electrical transducer (11) forming an actual pressure sensing means (11) coupled to and sensing actual pressure at the pneumatic pressure element (7) and providing an actual fluid pressure value;

comparator means (12) connected to receive the command value and the actual fluid pressure value for comparing said values and for providing a deviation signal if the values do not agree; and

a controlled valve means (13, 15) receiving the deviation value from said comparator means (12) connected to the pneumatic pressure element (7) for controlling pneumatic pressure therein to the level of said commanded value;

said valve means (13) including an inlet line (17*a*) for pressurized pneumatic fluid and a drain line (17*b*) and a servo positioning element (15) coupled to the comparator means and selectively opening or closing said inlet and said drain lines (17*a*, 17*b*) depending upon the deviation signal, whereby the opening and closing of said valve means need only compensate for a deviation between the command value and the actual pneumatic pressure value; said command means, said actual pressure sensing means (11), said comparator means, and said control valve means being connected into a closed control servo loop.

**4,713,048**

## PROCESS FOR THE PRODUCTION OF A LIQUID PACKAGE AND APPARATUS FOR IMPLEMENTATION OF THE PROCESS

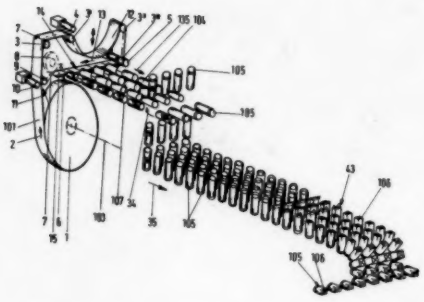
**Wilhelm Reil, Bensheim, and Ulrich Deutschbein, Mühltal, both of Fed. Rep. of Germany, assignors to Tetra Pak Finance & Trading S.A., Pully, Switzerland**

**Filed Sep. 3, 1986, Ser. No. 903,370**

**Claims priority, application Fed. Rep. of Germany, Sep. 5, 1985, 3531663**

**Int. Cl.[4] B31B** *1/16, 1/28*

**U.S. Cl. 493—74** **6 Claims**



1. A method for production of containers for packaging liquids, comprising the steps of:

providing a supply roll of a web of plastic-coated supporting material;

drawing said web of said material off said supply roll in a first direction along a web path;

at a first position, cutting said web into sheets, each of said sheets thereby having opposing side edges transverse to said first direction;

conveying said sheets along a transport path from said first position in a second direction transverse to said web path;

at a second position along said transport path, partially shaping each of said sheets into a tube by folding over a first of said side edges through 180° and sealing the resulting folded-over portion to an outer surface of said sheet, and simultaneously bending approximately half of said sheet semicircularly along a center line parallel to said second direction;

at a third position along said transport path, completing shaping each of said sheets into said tube by bending the remaining portion of said sheet semicircularly along said center line to cause said side edges to join, and sealing said folded-over portion onto the opposite of said side edges to define a longitudinal sealing seam for said tube;

molding a plastic lid defining an opening device onto a top end of each of said tubes; and

folding and sealing a bottom end of each of said tubes into a quadrilangular bottom.

2. Apparatus for the production of containers for packaging liquids, comprising:

a supply roll supporting a web of plastic-coated supporting material;

first means for conveying said web of said material from said supply roll in a first direction along a web path;

cutting means located at a first position along said web path for cutting said web into sheets such that each of said sheets is provided with opposing side edges tranverse to said first direction;

second means for conveying said sheets from said first position along a transport path in a second direction transverse to said web path, said transport path including a second and a third position of each said sheet;

shaping means for shaping each of said sheets into a tube, said shaping means including

an elongated mandrel disposed along said transport path and extending therealong from said second to said third position;

a first axle disposed parallel with said mandrel at said second position;

a plurality of first levers connected to said first axle configured for axially embracing a first half of said mandrel in semi-circular fashion;

a second axle disposed parallel with said mandrel at said third position;

a plurality of second levers connected to said second axle configured for axially embracing a second, opposite half of said mandrel in semi-circular fashion; and

means for pivotally driving said axles.

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**4,713,049**

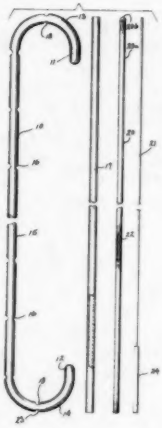
## URETERAL STENT KIT

**Garry L. Carter, Racine, Wis., assignor to Medical Engineering Corporation, Racine, Wis.**

**Filed Aug. 5, 1986, Ser. No. 893,381**

**Int. Cl.[4] A61M** *25/00*

**U.S. Cl. 604—8** **4 Claims**



1. A ureteral stent kit comprises an elongated flexible tubular stent of substantially uniform outside surface throughout its length having at least one end which is set in the form of a hook, said stent having a lumen; a flexible, reinforced guide member having a relatively more flexible, unreinforced tip portion and a lumen, said member being sized to fit within the lumen of the stent; and, a removable, relatively rigid, elongated core means for the guide member, said core means being sized to freely move within the lumen of said guide member.

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**4,713,050**

## APPLICATOR FOR NON-INVASIVE TRANSCUTANEOUS DELIVERY OF MEDICAMENT

**Dan Sibalis, Stony Brook, N.Y., assignor to Drug Delivery Systems Inc., New York, N.Y.**

**Continuation of Ser. No. 660,192, Oct. 12, 1984, Pat. No. 4,622,031, which is a continuation-in-part of Ser. No. 524,252, Aug. 18, 1983, Pat. No. 4,557,723. This application Oct. 24, 1986, Ser. No. 922,518**

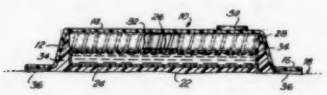
**The portion of the term of this patent subsequent to Dec. 10, 2002, has been disclaimed.**

**Int. Cl.[4] A61N** *1/30*

**U.S. Cl. 604—20** **6 Claims**

1. A self-contained electrically powered drug applicator for the migration of medicament through the skin into the blood stream of a patient comprising: reservoir means containing said medicament forming a first electrode, battery means for char-

ging/driving the medicament, means for covering comprising an electrically conductive material for partially enclosing at least said reservoir means leaving a side of said reservoir means exposed for contacting the skin, said cover means, being electrically connected to said battery means, and having a lip defining the periphery of said applicator and forming a second electrode for making contact with said skin when mounted on



said skin leaving at least said reservoir means fully enclosed, and an electrically conductive adhesive material coating disposed on at least the underside of said lip, whereby when said applicator is adhered to said skin a complete electrical circuit between said first and second electrodes and through said skin is formed so as to drive said medicament out of said reservoir means and through said skin into the blood stream of said patient.

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**4,713,051**

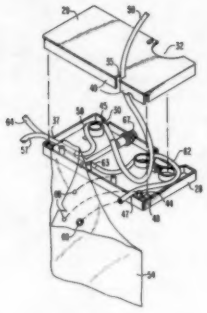
## CASSETTE FOR SURGICAL IRRIGATION AND ASPIRATION AND STERILE PACKAGE THEREFOR

**Dennis L. Steppe, Tustin; Larry L. Hood, Laguna Hills, and Gary D. Boggs, Santa Ana, all of Calif., assignors to CooperVision, Inc., Palo Alto, Calif.**

**Filed May 21, 1985, Ser. No. 736,335**

**Int. Cl.[4] A61M *1/00***

**U.S. Cl. 604—30** **16 Claims**



1. In combination:

a cassette having a housing defining an irrigation opening, an aspiration pump opening, and a VCS opening, the housing of said cassette defining an irrigation boss in register with said irrigation opening and having a leading edge surface;

a portion of an irrigation manifold located intermediate said leading edge surface of said irrigation boss and said irrigation opening;

an aspiration boss located in register with said aspiration pump opening;

a portion of an aspiration manifold connected intermediate said aspiration pump opening and said aspiration boss;

a cassette receiving mechanism which includes an irrigation solenoid having an occluder shaft, an aspiration pump and roller assembly, and a vacuum control system which includes a vacuum control system fitting;

said cassette mechanism and said cassette thus interfacing when connected so that said occluder shaft of the irrigation solenoid passes through the irrigation opening of the cassette to occlude said irrigation manifold against said leading edge surface of said irrigation boss, thereby to control flow of irrigation fluid through said irrigation manifold; and so that the roller assembly of said aspiration pump occupies said aspiration pump opening of said cassette and occludes said aspiration manifold against said aspiration boss, thereby to control the aspiration of fluid through said aspiration manifold;

said VCS fitting connecting with said VCS opening in a sealing manner.

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**4,713,052**

## APPARATUS FOR ASPIRATING SECRETED FLUIDS FROM A WOUND

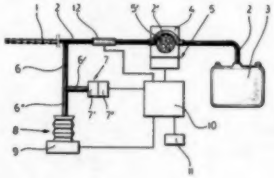
**Walter Beck, Obere Häslibachstr. 87, CH-8700 Küsnacht; Siegfried Berger, Wernau, and Margrit Werner, Lion-Feuchtwanger Str. 69, 6500 Mainz-Hechtsheim, all of Fed. Rep. of Germany, assignors to Walter Beck and Margrit Werner, both of, Fed. Rep. of Germany**

**Filed Nov. 18, 1985, Ser. No. 798,844**

**Claims priority, application Fed. Rep. of Germany, Nov. 16, 1984, 3441893**

**Int. Cl.[4] A61M *31/00***

**U.S. Cl. 604—48** **5 Claims**



1. Apparatus for aspirating secreted fluids from a wound comprising a controllable negative pressure source to which a drain is connected by means of a tube, a container for collecting the aspirated secreted fluid, a negative pressure measuring device and a regulator which controls the negative pressure source with inputs for the actual value determined by the negative pressure measuring device and for the prescribed set point values of the negative pressure, further including a hollow element having a variable inside volume, the inner chamber of which communicates with that of the tube leading to the drain,

wherein the lateral boundary wall of the hollow element is formed by a folding bellows, drive means for adjusting the closure elements bounding the folding bellows at both sides relative to each other in the longitudinal direction of the bellows.

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**4,713,053**

## METHOD AND APPARATUS FOR PERFORMING SUCTION LIPECTOMY

**Hans Lee, 526 Sheridan Cir., Charleston, W. Va. 25314**

**PCT No. PCT/US85/00814, § 371 Date Jan. 3, 1986, § 102(e) Date Jan. 3, 1986, PCT Pub. No. WO85/05024, PCT Pub. Date Nov. 21, 1985**

**Continuation-in-part of Ser. No. 607,714, May 7, 1984, Pat. No. 4,596,553, and a continuation-in-part of Ser. No. 651,720, Sep. 18, 1984, Pat. No. 4,627,834. This PCT application May 6, 1985, Ser. No. 887,040**

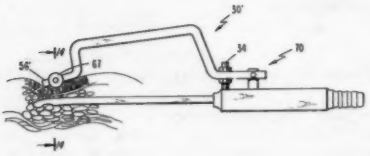
**Int. Cl.[4] A61M *31/00, 5/00***

**U.S. Cl. 604—49** **16 Claims**

1. A device for surgically aspirating subcutaneous fatty tissue and the like from an animate body, comprising:

(a) a cannula having a tip and a handle at opposite ends thereof, the tip being formed with a hole, and a longitudinal passage extending through the cannula in communication with the hole, said passage being connectable to a source of vacuum so that suction can be applied to surgically aspirate fatty tissue through the hole when the tip is inserted in the tissue;

(b) guide means attached to the cannula for maintaining the hole at a predetermined depth within the tissue as the tip is manually directed by a surgeon through the tissue in reciprocating strokes, said guide means including a guide



surface defined by guide wheel means in rolling contact with, during surgery, a portion of the skin overlying the fatty tissue to limit the depth at which the hole penetrates the tissue; and

(c) means for connecting the guide means to the cannula.

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**4,713,054**

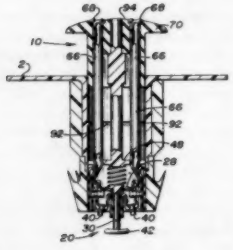
## IMPLANTED MUSCLE POWERED DRUG DISPENSING SYSTEM

**L. Thomas Kelly; Esther V. M. Hamel, both of Rte. 1, Box 68, St. Ignatius, Mont. 59865, and Robert P. Bielka, 2211 N. 59th St., Seattle, Wash. 98103**

**Continuation-in-part of Ser. No. 830,999, Feb. 19, 1986, abandoned. This application Mar. 4, 1986, Ser. No. 836,010**

**Int. Cl.[4] A61M *5/00***

**U.S. Cl. 604—89** **18 Claims**



1. A muscle powered liquid drug delivery device implanted in the region behind an animal's ear bounded cranially by the posterior border of the conchal cartilage, caudally by the anterior border of the cleidooccipitalis muscle, and medially by the splenius muscle, said device comprising:

(a) balloon-like reservoir means including a plurality of balloon-like reservoirs, said reservoir means in expanded condition aiding in anchoring the device in the animal; and

(b) pump means having inlet means in fluid communication with each of said reservoirs and outlet means in fluid communication with the adjacent tissue of the animal, said pump means including a pump body defining a pump chamber and including a flexible impermeable pump body, said pump chamber communicating through inlet valve means with the reservoir means, and through outlet valve means with the animal's tissue surrounding the device, a piston having a piston head fixedly attached to an upper portion of the pump body, a piston shaft fixedly attached to and depending from the piston head and extending downwardly to a lower end positioned adjacent the animal's splenius muscle, said lower end and in turn the piston being translated by movement of the animal's muscles and tissues to vary the volume of the pump chamber, and means biasing the piston in a direction which minimizes the volume of the pump chamber, said pump means further including compressive means actuating flow of fluid therethrough responsive to flexure of the animal's muscles and tissues surrounding and underlying said region, whereby the liquids from the reservoirs are mixed in said pump means.

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**4,713,055**

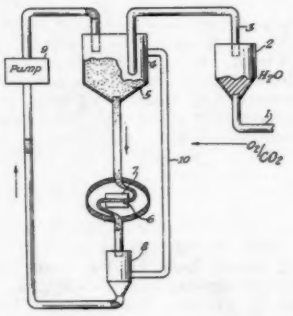
## ARTIFICIALLY VASCULARIZED GRAFT

**Donato A. Viggiano, 1090 Virginia Ave., Ft. Pierce, Fla. 33450**

**Division of Ser. No. 506,858, Jun. 22, 1983, abandoned. This application Mar. 18, 1986, Ser. No. 842,351**

**Int. Cl.[4] A61M *11/00*; A61N *1/02***

**U.S. Cl. 604—93** **23 Claims**




1. A process for maintaining a graft or flap for animals viable for a period of time before surgical use comprising:

(1) initially providing a fluid including a source of oxygen;

(2) thereafter providing a graft or flap;

(3) thereafter placing at least one artificial capillary tube into said graft or flap, said tube being formed of a material permitting said fluid to perfuse therethrough; and

(4) then flowing said fluid first through said tube and then perfusing said fluid within said graft or flap;

the quantity of oxygen from said oxygen source, the number of capillary tubes, and the rate of flow of said fluid being so correlated for maintaining said graft or flap viable for a sufficient period of time thereby preventing necroses of said flap or graft prior to surgical use,

said process including the additional step of surgically transplanting said graft or flap to a segment of a living body.

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**4,713,056**

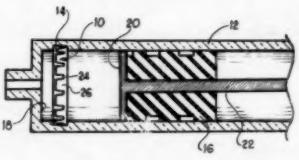
## NON-REUSABLE HYPODERMIC SYRINGE

**Ida M. Butterfield, Santa Maria, Calif., assignor to Butterfield Group, Santa Maria, Calif.**

**Filed Jun. 23, 1986, Ser. No. 877,288**

**Int. Cl.[4] A61M *5/00***

**U.S. Cl. 604—110** **5 Claims**



1. A non-reusable hypodermic syringe characterized in that it is extremely robust, and comprising:

a hollow cylindrical tubular member closed at a first end except for an axial passage, having a cylindrical inside wall, and including portions defining an internal circum-

ferential groove located adjacent but spaced axially from said first end;

a drive rod extending axially in said tubular member;

a piston head permanently attached to the end of said drive rod nearest the first end, slidable axially within said tubular member, and substantially rigid;

a latch ring consisting of a generally ring-shaped unitary structure, residing in said groove, and including resilient fingers that all extend toward said first end and slightly radially inwardly into the cylindrical space defined within the cylindrical inside wall of said tubular member, the resiliency of said fingers permitting them to deflect into said groove when said piston head is pushed toward said first end past said fingers, and then to spring back into the cylindrical space to catch against said piston head when the latter is pulled away from said first end, thereby preventing refilling of the syringe by preventing movement of said piston head away from said first end.

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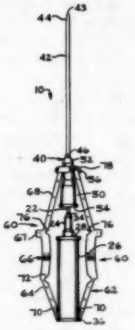
**4,713,057**

## MECHANICAL ASSIST DEVICE FOR INSERTING CATHETERS

**James Huttner, Toledo, and Marc M. Levine, Sylvania, both of Ohio, assignors to Medical College of Ohio, Toledo, Ohio**

**Filed Feb. 27, 1984, Ser. No. 583,663**
**Int. Cl.[4] A61M 5/18**
**U.S. Cl. 604—164** **11 Claims**



**11**. Apparatus for the insertion of a catheter comprising:

a needle member, said needle member including a needle having a first end and a second end, said first end of said needle being disposed for insertion into a vein of a patient;

a catheter unit positioned around said needle member, said catheter unit including a hollow catheter member that is movably and axially positioned around said needle, said catheter member having a first end and a second end, said first end of said catheter member terminating adjacent said first end of said needle, said first end of said needle extending from said catheter member; and

a handle member operatively connected to said needle member and said catheter unit, said handle member being positioned in adjacent spaced apart relationship with said needle member, said handle member and said needle member being designed to be held in one hand, said handle member includes at least two moveable strut members positioned in substantially opposed relationship and equidistance apart around said needle member, said strut members having a first end connected to said needle member and a second end positioned adjacent said catheter unit, said strut members being movable in a direction towards said needle member, said strut members include a first segment extending from said needle member at an acute angle, a second segment connected to said first segment and being positioned in substantially the same longitudinal plane as said first segment, said second segment extending from said first segment at an obtuse angle, said second segment being substantially parallel to the longitudinal axis of said needle member, a third segment connected to said second segment and being positioned in substantially the same longitudinal plane as said first and second segments, said third segment extending from said second segment at an obtuse angle, said third segment extending in a direction towards said catheter unit, said end of said third segment that is spaced apart from said second segment being in engagement with said catheter unit, said handle member being deformable towards said needle member whereby said handle member acts upon said catheter member to advance said catheter member along said needle whereby said first end of said catheter member is advanced beyond said first end of said needle into said vein of said patient and said needle member and handle member can be removed from said catheter unit to leave said catheter unit operatively positioned in said vein, only one hand being required to position and insert said catheter unit in said vein.

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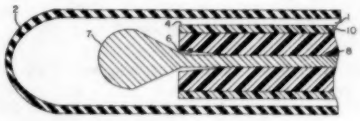
**4,713,058**

## GUIDING MANDRIN FOR DRAINAGE DUCTS

**Hans-Ernst Sachse, Lerchenstrasse 55, 8500 Nuremberg 90, Fed. Rep. of Germany, assignor to Hans-Ernst Sachse, Nuremberg, Fed. Rep. of Germany**

**Filed Mar. 27, 1986, Ser. No. 844,675**
**Int. Cl.[4] A61M 5/00**
**U.S. Cl. 604—165** **5 Claims**



**1**. A guiding mandrin for insertion into a drainage duct comprising:

a long horizontal tube made of elastic material or from flexible resilient metal wherein the tip of said tube is split,

and a wedge push-pull wire passes through the entire length of said tube and extend beyond both ends thereof, said wire having a wedge means firmly attached to said wire end extending beyond the tip end of said tube, the diameter of the wedge means being greater than the diameter of said tube,

whereby the split end of said tube is forced outwardly to engage the inner wall of the drainage duct by manipulating said wire so as to move the wedge means into the split end of said tube and is disengaged from said wall by moving the wedge means out of the split end of said tube.

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**4,713,059**

## DISPENSER FOR AN ELONGATED FLEXIBLE MEMBER

**Roger Bickelhaupt, Orange, and Michael D. Rold, Costa Mesa, both of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.**

**Filed Oct. 11, 1984, Ser. No. 659,702**
**Int. Cl.[4] A61M 5/00**
**U.S. Cl. 604—171** **18 Claims**

**11**. A dispenser for an elongated flexible member comprising:

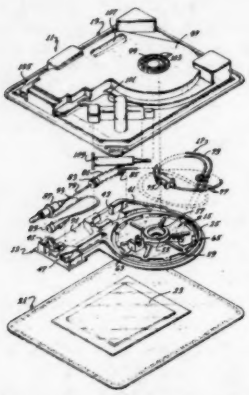
a base;

a reel having a side face;

means for mounting the reel on the base for rotation relative to said base about a rotational axis;

said reel having first and second sets of radially extending fingers at the periphery of the reel with said first set of fingers being inclined axially relative to the second set of fingers whereby said flexible member can be wound on

the reel adjacent said periphery between said first and second sets of fingers; and



means on said face of the reel for releasably retaining an inner end portion of the flexible member.

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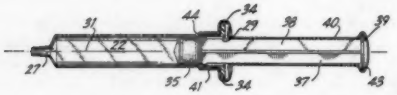
**4,713,060**

## SYRINGE ASSEMBLY

**Arduino Riuli, Wayne, N.J., assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.**

**Filed Jun. 20, 1986, Ser. No. 876,501**
**Int. Cl.[4] A61M 5/32**
**U.S. Cl. 604—199** **21 Claims**



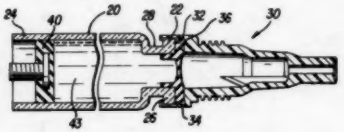
1. An operable syringe assembly comprising:
a hollow barrel having a chamber for retaining fluid;
a proximal end of said barrel having an aperture therethrough;
a distal end of said barrel having a passageway therethrough communicating with said chamber;
a stopper slidably positioned in fluid-tight engagement inside said barrel, said stopper capable of moving fluid from said chamber through said passageway upon its movement toward said distal end, said stopper capable of facilitating the drawing of fluid into said chamber through said passageway upon its movement away from said distal end;
a plunger rod having an elongate body portion engaging said stopper to facilitate operation of said stopper, said body portion extending outwardly from said proximal end of said barrel, through said aperture; and
a flexible cover having a closed first end and an open second end, said open second end being attached to said barrel covering said aperture and containing that portion of said elongate body portion of said plunger rod protruding from said aperture, said covering being flexible enough and strong enough to allow movement of said plunger rod for operating said syringe without tearing, said cover acting as a barrier for helping to block the transfer of fluid and particulate matter between said chamber and the environment.

**4,713,061**

## CARTRIDGE WITH UNIVERSAL PLASTIC HUB

**William R. Tarello, Bethesda; Linda A. Gordon, Germantown, both of Md., and T. Daniel Whalen, Trenton, N.J., assignors to Survival Technology, Inc., Bethesda, Md.**

**Filed Jul. 14, 1986, Ser. No. 885,164**
**Int. Cl.[4] A61M 5/24**
**U.S. Cl. 604—200** **8 Claims**



1. In a cartridge assembly comprising a cylindrical body, said body having a forward end and a rearward end, the forward end being necked down to form an annular flange, a hub fitted on the annular flange, a diaphragm seal positioned on the forward face of the annular flange and held in sealing position by the hub fitted on the annular flange, a piston slidably carried in the rearward portion of the body, a liquid medicament held in the body in the space between the diaphragm and the piston,
said hub being made of transparent plastic material and comprising:
(1) a first cylindrical portion having a rearward end and a forward end and an inner and an outer surface, the internal diameter of the first cylindrical portion being sized to fit over the annular flange of the necked down portion of the cartridge body,
(2) a second cylindrical portion having a rearward end and a forward end and an inner and an outer surface, said rearward end extending forwardly from the forward end of the first cylindrical portion and coaxial with said first cylindrical portion, the second cylindrical portion having a diameter less than that of the first cylindrical portion, a shoulder portion generally perpendicular to the axis of the two cylindrical portions and connecting the rearward end of the second cylindrical portion to the forward end of the first cylindrical portion;
(3) a third cylindrical portion having a rearward end and a forward end and an inner and an outer surface, said rearward end extending forwardly from the forward end of the second cylindrical portion and coaxial with the second cylindrical portion, the third cylindrical portion having a diameter less than that of the second cylindrical portion and having its rearward end connected to the forward end of the second cylindrical portion,
(4) a fourth cylindrical portion having a rearward end and a forward end and an inner and an outer surface, said rearward end connected to the forward end of the third cylindrical portion and coaxial with the third cylindrical portion, the fourth cylindrical portion having a diameter less than that of the third cylindrical portion,
(5) the internal diameter of the axial hole in the fourth cylindrical portion being sized to receive the non patient end portion of a needle,
(6) the outer surface of the third cylindrical portion being tapered 6° inwardly and forwardly so as to accommodate mounting means embodying the standard Luer taper,
(7) the diaphragm chamber defined by the inner surface of the second cylindrical portion being provided with a spike, said spike having a pointed portion directed toward the rearward end of the second cylindrical portion and offset from the axis of said second cylindrical portion, the point of said spike being spaced from the rearward end of the second cylindrical portion a sufficient amount so that the diaphragm will normally

balloon and then burst in the diaphragm chamber upon contacting the spike,

(8) the outer surface of the second cylindrical portion being provided with peripheral threads extending from adjacent the shoulder portion connecting the first and second cylindrical portions to near the forward end of the second cylindrical portion, said threads being sized to cooperate with like means on a cartridge holder, and the threads acting as magnifying means to aid in viewing within the diaphragm chamber whereby it will be easy to look through the threads and in a magnified rendition see whether or not blood appears in said chamber to thereby indicate that a blood vessel has been pierced by the needle in the injection procedure.

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**4,713,062**

## READY TO USE SYRINGE

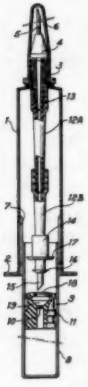
**Giovanni Stevanato, Chiasso, Switzerland, assignor to Vecta Glass Company Ltd., London, England**

**Filed May 29, 1986, Ser. No. 868,076**

**Claims priority, application Luxembourg, May 29, 1985, 85916**

**Int. Cl.[4] A61M *5/24***

**U.S. Cl. 604—203** **10 Claims**



1. A ready to use syringe, said syringe comprising in combination a cylindrical shaped container for an injectable solution, said cylindrical shaped container also serving as a piston and being closed by a piston plug, said piston plug may be perforated by a point extending downwards from a small suction tube, said small suction tube being fixed to the outer casing of said syringe in correspondence with a head for recording to a guide cone of an administration needle, said point for perforating said piston plug being provided with means for securing the piston itself, preventing mutual detachment at the time of use, and allowing the visual control, by means of a slight suction resulting from the correct introduction of the administration needle into the tissue of a patient.

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**4,713,063**

## INTRAVENOUS TUBE AND CONTROLLER THEREFOR

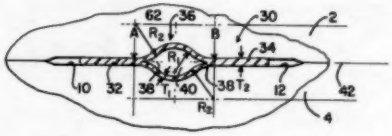
**John F. Krumme, Woodside, Calif., assignor to Beta Phase, Inc., Menlo Park, Calif.**

**Continuation-in-part of Ser. No. 733,036, Apr. 29, 1985, Pat. No. 4,645,489, which is a continuation of Ser. No. 445,390, Nov. 30, 1982, abandoned. This application May 1, 1986, Ser. No. 857,974**

**Int. Cl.[4] A61M *5/00***

**U.S. Cl. 604—250** **4 Claims**

1. An I.V. flow control tube adapted to be used in an I.V. control wherein the metering characteristics of the tube require the repeated controlled closing and time responsive opening of the tube in operation, the tube consisting essentially of a hollow elongated tube of resilient material through which fluid may flow, said tube having a reformed section which has an internal cross-section defined by symmetrical catenary shaped wall portions joining approximately tangentially in opposed sharp internal corners, said section of said tube having a center region having an internal radius for each catenary shaped wall portion, said section of said tube having end regions each having an external reverse radius for each wall




portion such that the wall portions join approximately tangentially in opposed sharp internal corners and wherein the internal radii and said external reverse radii are approximately equal within the range of about 0.75 to 1.25, said wall portions capable of being moved toward each other to flatten said tube and control fluid that may flow therethrough, the shape of said cross-section in combination with resilient recovery forces inherent in said material producing a residual reopening force.

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**4,713,064**

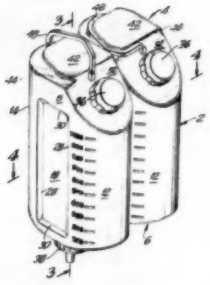
## ENTERAL FEEDING DEVICES

**Robert Bruno, Avon; Stuart R. Kipperman, Easton; Geoffrey R. Mayer, Trumbull, all of Conn., and Michael Thomas, Ann, Ohio, assignors to Sherwood Medical Company, St. Louis, Mo.**

**Continuation of Ser. No. 728,862, Apr. 30, 1985, abandoned. This application Apr. 18, 1986, Ser. No. 853,400**

**Int. Cl.[4] A61M *5/85***

**U.S. Cl. 604—257** **10 Claims**



1. An enteral feeding device comprising:

a. a rigid plastic substantially rectangular container adapted to contain a supply of liquid nourishment, said container including a substantially flat front wall and a substantially flat rear wall.

b. curved walls joining the front and rear walls,

c. a projection extending from one of said front and rear walls, said projection having a length substantially equal to the length of the container and a width substantially equal to the width of the flat portion of the wall;

d. a recess on the other of said front and rear walls, said recess having a length substantially equal to the length of the container and a width substantially equal to the width of the flat portion of the wall;

e. said projection and said recess being dimensioned so that the projection on said container can nest in the recess of another container in side-by-side relationship, and

f. an opening with a spout at one end of the container and

another opening with a spout at the other end of the container, said openings being adapted to permit the flow of liquid nourishment therethrough.

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**4,713,065**

## URINE-RECEIVING SYSTEM

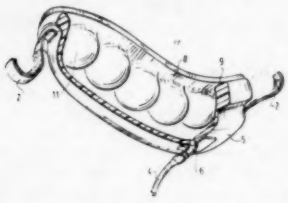
**Hubertus H. M. Koot, Cuyk, Netherlands, assignor to Mandhy Products B.V. Cuyk, Netherlands**

**Filed Jun. 3, 1986, Ser. No. 869,877**

**Claims priority, application Netherlands, Mar. 13, 1986, 8600656**

**Int. Cl.[4] A61F 5/44**

**U.S. Cl. 604—329** **13 Claims**



**9**. A urine-receiving system intended particularly for women comprising oblong receiving means formed of elastic material of stable form, said receiving means defining a cavity therein and a receiving opening in one side thereof for receiving urine into said cavity, said receiving means having a drainage opening at another side thereof opposite to said one side of the receiving means and being in communication with said cavity, a flexible drainage conduit connected to said drainage opening, a collecting reservoir connected to said drainage conduit for receiving fluid from said drainage opening, an inset-body formed of moisture absorbing material for directly receiving urine, said inset-body being supported by said receiving means and overlying said receiving opening, said inset-body having pumping means extending into said cavity including a plurality of integral portions extending within said receiving element and having spaced outer surfaces which provide material-free space within the receiving element and in communication with said drainage opening, said receiving means having wall portions engageable with said integral portions of the inset-body for alternately pressing inwardly and releasing said integral portions upon movement of the legs of an associated patient to squeeze fluid from the inset-body and drain such fluid through said material-free space to the drainage opening.

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**4,713,066**

## EXTERNAL MALE URINARY CATHETER WITH GARMENT

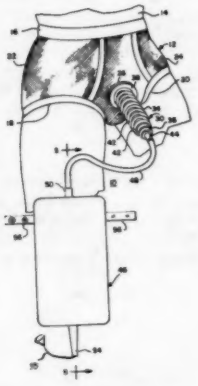
**Glenna Komis, P.O. Box 163, Hammonton, N.J. 08037**

**Filed Mar. 20, 1986, Ser. No. 841,590**

**Int. Cl.[4] A61F 5/44**

**U.S. Cl. 604—353** **11 Claims**

**1**. An external male urinary catheter assembly comprising a moderately thin, flexible, resilient durable tubular sheath dimensioned to be positioned in enclosing relation to a substantial portion of the penis, said sheath including a distal tubular member having a central aperture providing an open end, the proximal end of said sheath opposite to said distal end portion forming an annular flange, said catheter sheath having a pleated portion between said distal and proximal ends, at the proximal end said pleats having an inner diameter to encircle the penis without constricting the same and at the distal end said pleats having an inner diameter smaller than the inner diameter at the proximate end, and a resilience to snugly engage the tip of the penis without constricting the flow of urine therethrough; drainage tubing telescopically engaging said tubular member to communicate at the distal end with said tubular sheath through said aperture and extending to a connection element, said connection element communicating with a collection receptacle having means for attachment either to the ambulatory wearer at his calf or to the bedside of the bedridden wearer; and a supporting garment of the men's brief type, having elasticized leg openings and an elasticized waistband, said garment composed of an absorbent material and having an annular reinforcement on the front thereof complementary to said flange, and dimensioned to encircle the penis without constricting the same, said flanged end portion engaging said reinforcement and securely united thereto by fastening means continuously circumscribing said reinforcement and said flange respectively to provide a continuous connection therebetween without substantially constricting the penis.



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**4,713,067**

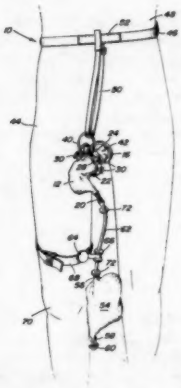
## URINARY COLLECTION SYSTEM FOR MALE INCONTINENT

**I. Herbert Rothenberg, and Thelma Rothenberg, both of 319 Hill House, Huntingdon Pike, Huntingdon Valley, Pa. 19006**

**Filed Jun. 19, 1986, Ser. No. 876,089**

**Int. Cl.[4] A61F 5/44**

**U.S. Cl. 604—353** **21 Claims**



**21**. A body worn urinary collection system for a male incontinent, said apparatus comprising:

(a) a reusable, generally moistureproof and pliable penile sheath shaped as a sack with a closed corn-shaped end and an open end at generally right angles to said closed end, said sack sized to loosely overfit the male organ and formed of two longitudinal seamed halves;

(b) a first oversized, resilient, outer ferrule integral with and rimming said sack's open end to aid in mounting said sheath and a second resilient, cleated ferrule proximate said sheath's middle, said second cleated ferrule forming a tunnel to hold said mounted sheath spaced apart from the penis, said sheath also including a urine outlet proximate its closed end;

(c) means to releasably secure said sack to said male organ proximate its intersection with the body, said means including a strap, one end of which is attached to said sack between said first outer ferrule and said second cleated ferrule and the other end of said strap terminating in a ring;

(d) a generally pliable and waterproof urine storage bag including an intake urine orifice and an outlet urine orifice, said storage bag outlet orifice including plug means;

(e) a thigh strap;

(f) a flexible drain tube having means for mounting said tube on either of a user's thighs, said drain tube being of a user-determined length to span from said sheath urine outlet to said storage bag intake urine orifice;

(g) means to attach said tube ends, one each to, respectively, said sheath urine outlet orifice and said storage bag intake urine orifice;

(h) a spool slidably mounted on said drain tube;

(i) a strap mounted at one end on said spool; and,

(j) a double faced engaging pad mounted on said strap's other end and having means removably attaching said pad to said thigh strap to aid in the positioning and angulation of said drain tube between the user's legs,

so that when said sheath is worn, said first ferrule permits ease of donning and said second ferrule's cleats and said strap's ring together provide adjustable closing means and wherein urine evacuated by the user may be collected and transferred from said sheath through said drain tube and collected into said urinary storage bag without leakage or backflow.

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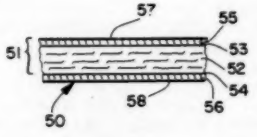
**4,713,068**

## BREATHABLE CLOTHLIKE BARRIER HAVING CONTROLLED STRUCTURE DEFENSIVE COMPOSITE

**Kenneth Y. Wang, Roswell, and Richard S. Yeo, Dunwoody, both of Ga., assignors to Kimberly-Clark Corporation, Neenah, Wis.**

**Filed Oct. 31, 1986, Ser. No. 925,425**
**Int. Cl.[4] A61F *13/16***
**U.S. Cl. 604—366** **69 Claims**




1. A breathable clothlike barrier which comprises a defensive composite comprising at least two layers:

A. a first layer which is a clothlike porous substrate having a first side and a second side, in which:

said first layer has a nominal basis weight of at least about 10 $g/m^2$;

the fibers comprising said first layer have an average fiber diameter in the range of from about 0.01 to about 10 microns; and

each of substantially all of the pores at the surface of said first side of said first layer has a cross-sectional area of from about $6\times10^{-16}$ $m^2$ to about $2\times10^{-9}$ $m^2$; and

B. a second layer joined to said first side of said first layer, which second layer comprises a continuous film of a poly(vinyl alcohol), in which:

said film is not microporous in that it is substantially free of voids which connect the two surfaces of said film; and

said film has an average thickness of (a) from about 3 to about 25 microns when the basis weight of said first layer is at least about 20 $g/m^2$ or (b) from about 8 to about 25 microns when the basis weight of said first layer is from about 10 to less than about 20 $g/m^2$;

wherein the first layer side of said second layer is intimately comingled with at least some of the fibers at the surface of said first side of said first layer, and said defensive composite has a water vapor transmission rate at 37 degrees C. and about 50 percent relative humidity of from about 100 to about 5,000 $g/m^2/24$ hours and is impermeable to 0.9 percent by weight saline solution at about 21 degrees C. for a period of at least about one hour at a hydrostatic head of at least about 11.4 cm.

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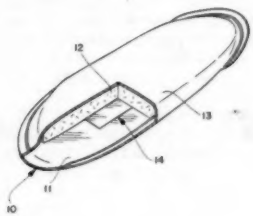
**4,713,069**

## BAFFLE HAVING ZONED WATER VAPOR PERMEABILITY

**Kenneth Y. Wang, Roswell, and Richard S. Yeo, Dunwoody, both of Ga., assignors to Kimberly-Clark Corporation, Neenah, Wis.**

**Filed Oct. 31, 1986, Ser. No. 925,446**
**Int. Cl.[4] A61F *13/16***
**U.S. Cl. 604—378** **44 Claims**




1. A baffle having a central zone extending along at least a portion of the length thereof,

A. said zone being impermeable to menses under a static pressure of from about 1 to about 3 psi for a period of at least about one hour and having a water vapor transmission rate at 37 degrees C. and about 50 percent relative humidity of from about 50 to about 2,500 $g/m^2/24$ hours,

B. with the non-central zone portions of the baffle being impermeable to menses under a static pressure of from about 0.1 to about 1 psi for a period of at least about one hour and having a water vapor transmission rate at 37 degrees C. and about 50 percent relative humidity of from about 1,500 to about 5,000 $g/m^2/24$ hours;

in which said baffle comprises a fibrous porous substrate and a water vapor-permeable material overlaying and joined to said fibrous porous substrate in the area of said central zone; with the proviso that the water vapor transmission rate of the central zone is less than that of the non-central zone portions of the baffle.

## 4,713,070
## POROUS STRUCTURE OF POLYTETRAFLUOROETHYLENE AND PROCESS FOR PRODUCTION THEREOF

Hiroshi Mano, Osaka, Japan, assignor to Sumitom Electric Industries, Ltd., Osaka, Japan

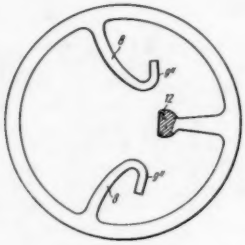
Continuation of Ser. No. 333,357, Dec. 22, 1981, abandoned, which is a continuation of Ser. No. 98,283, Nov. 28, 1979, Pat. No. 4,332,035. This application Jan. 24, 1986, Ser. No. 821,528
The portion of the term of this patent subsequent to Jun. 1, 1999, has been disclaimed.
Int. Cl.[4] A61F 2/06, 2/02
U.S. Cl. 623—1 11 Claims

1. A unitary porous structure of polytetrafluoroethylene having a microfibrous structure composed of fibers and nodes connected to one another by these fibers, said microfibrous structure having at one surface a strong orientation of fiber in one direction and at another surface a strong orientation of nodes sintered by means of heating above 327° C. resulting in melt-adhesion of the nodes connected to one another in a direction at right angles to the aforesaid direction, the orientation of said microfibrous structure progressively changing from one surface to the other.

## 4,713,071
## HEART VALVE PROSTHESIS

Naum A. Iofis, Lomonosovsky prospekt, 23, kv. 416; Rudolf N. Vettsel, ulitsa Vinokurova, 24, korpus 4, kv. 63; Alexandr S. Bukatov, ploschad Pobedy, 1, korpus "A", kv. 122, and Semen G. Khurtsilava, ulitsa Kedrova, 5, kv. 118, all of, Moscow, U.S.S.R.

Continuation of Ser. No. 969,424, Jan. 30, 1985, abandoned. This application Sep. 10, 1986, Ser. No. 906,623
Claims priority, application U.S.S.R., Feb. 16, 1984, 3700753
Int. Cl.[4] H61F 2/24
U.S. Cl. 623—2 7 Claims

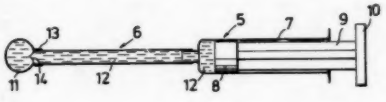


1. A heart valve prosthesis comprising: a valve ring having an opening therein for the flow of blood, a valve poppet having a top side and a bottom side and a concentric depression in the top side thereof, said concentric depression including a surface portion, containing means for floatingly containing the poppet during opening and closing, said containing means being formed by a lower support structure for holding the bottom side of the poppet during closing and by a single upper support and stop member for engaging the top side of the poppet within the depression thereof, said upper support and stop member being mounted on a radial holder extending from said valve ring, said upper support having an inclined surface portion with a surface area which corresponds in surface configuration with and is in surface area contact with said surface portion of said concentric depression when said valve poppet is in an open position to permit blood to pass through said ring opening and is inclined with respect to a horizontal diametrical plane of the valve ring at an angle corresponding to the angle of inclination of the valve poppet with respect to the same plane when the poppet is in the open position to thereby define a stop, and said lower support structure having profiled end portions extending transversely with respect to said radial holder, the profiles of said end portions defining pivot surfaces for the poppet and corresponding to the profile of adjacent portions of the bottom side of the poppet on the sides of said end portions facing toward the holder for engaging the bottom side of the poppet with surface area contact in the open position of the poppet, the end portions of said lower support structure being spaced apart from each other with a clearance space therebetween, and the inclined surface portion of said upper support facing the space between the profiled end portions of said lower support structure, the surface area contact of the poppet with said surface portion of the upper support and said pivot surfaces of the lower support structure in the open position distributing support forces over said surface areas to reduce wear and prolong service life of the prosthesis.

## 4,713,072
## IMPLANT LENS AND METHOD AND APPARATUS FOR ITS PRODUCTION

Staffan F. Bowald, Storvreta, Sweden, assignor to Swedish Graft Technique AB, Sweden

Filed Nov. 19, 1986, Ser. No. 932,298
Claims priority, application Sweden, Nov. 22, 1985, 8505518
Int. Cl.[4] A61F 2/16; A61B 17/00
U.S. Cl. 623—6 13 Claims



1. An implant lens having at least the outer layer thereof consisting of substantially water-insoluble biodegradable and biocompatible material capable of providing a growth zone for the natural eye lens tissue.

13. An apparatus for producing an implant lens, comprising syringe member for holding a first, fluid lens material, an envelope member of a second lens material, communicatively connected to said syringe member, and means for permitting separation of said envelope member after it has been filled with said first material to form said implant lens wherein said first and second lens materials are biodegradable.

## 4,713,073
## PLASTIC IMPLANT

Johannes Reinmüller, An der Schanze 5, D-6500 Mainz, Fed. Rep. of Germany

Continuation of Ser. No. 724,208, Apr. 17, 1985, abandoned. This application Dec. 22, 1986, Ser. No. 945,173
Claims priority, application Fed. Rep. of Germany, Aug. 17, 1983, 3329733
Int. Cl.[4] A61F 2/12
U.S. Cl. 623—8 4 Claims

1. A method for preventing and/or treating capsule formation and/or shrinkage around a plastic implant in a blood dry

tissue cavity for construction or reconstruction of the female breast, comprising, before implanting the implant, covering

and bonding to the surface of said implant, a substance selected from the group consisting of heparin, heparinoids or glycosaminoglycans chemically related to heparin.

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**4,713,074**

**IMPLANT DEVICE FOR THE SURGICAL TREATMENT OF INFERTILITY DUE TO OBSTRUCTION OF UTERINE TUBES**

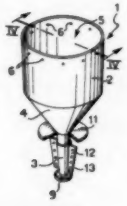
**Renato Piacentino, Viale del Cstello 32, 10024 Moncalieri (Torino), Italy**

**Filed Jun. 9, 1986, Ser. No. 871,785**

**Claims priority, application Italy, Jun. 12, 1985, 67549 A/85**

**Int. Cl.⁴ A61F *2/04***

**U.S. Cl. 623—12** **12 Claims**



**1**. An implant device for the surgical treatment of infertility due to obstruction of uterine tubes, intended to be implanted in a position approximately homologous to the obstructed natural tube to bring the respective ovary closer to the uterus, comprising a generally tubular envelope having a wider portion intended to receive the respective ovary and a narrower portion intended to extend through the wall of the uterus, said narrower portion having a length corresponding substantially to a thickness of the wall of the uterus, said wider portion and said narrower portion being immediately adjacent one another and connected together in a general funnel-shaped configuration converging towards said narrower portion.

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**4,713,075**

**METHOD FOR THE REPAIR OF CONNECTIVE TISSUE**

**Kenneth Z. Kurland, 2 W. McCabe Rd., El Centro, Calif. 92243**

**Division of Ser. No. 589,713, Mar. 15, 1984, abandoned, which is a continuation-in-part of Ser. No. 524,351, Aug. 18, 1983, Pat. No. 4,585,458, which is a continuation-in-part of Ser. No. 272,134, Jun. 10, 1981, Pat. No. 4,400,833. This application Oct. 20, 1986, Ser. No. 920,408**

**Int. Cl.⁴ A61F *2/08***

**U.S. Cl. 623—13** **3 Claims**

**1**. A method for repairing a connective tissue lesion such as a tendon, linear ligament or capsular ligament, and for promoting the regrowth of at least one damaged portion of the tissue toward its point of attachment, which comprises:

attaching to said portion one of each end of a plurality of lengths of composite thread comprising a core of filament coated with an absorbable composition;

said core filaments being braided together;

and said plurality of composite threads being braided together into a length of rope;

tauntly securing the other ends of thread to said point of attachment; and

allowing growth of the tissue around the lengths of thread.

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**4,713,076**

**COATING COMPOSITION AND ANCHORAGE COMPONENT FOR SURGICAL IMPLANTS**

**Klaus Draenert, Gabriel-Max-Strasse 3, Munich, Fed. Rep. of Germany**

**Filed Apr. 17, 1985, Ser. No. 724,103**

**Claims priority, application Fed. Rep. of Germany, Apr. 19, 1984, 3414924**

**Int. Cl.⁴ A61F *2/28, 2/32***

**U.S. Cl. 623—16** **15 Claims**

**1**. A resorbable coating composition for anchorage components for surgical implants, consisting of a dried resorbable filling material and a resorbable binding agent, wherein the filling material consists of porous spherical particles containing solid tricalcium phosphate or apatite and having a diameter from about 15 to 50 μm and a pore volume from about 25 to about 80%, the pores of the spherical particles being filled with the resorbable binding agent.

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**4,713,077**

**METHOD OF APPLYING A CHIN IMPLANT, DRILL GUIDE TOOL AND IMPLANT**

**Irwin A. Small, 6861 Orinoco Cir., Brimingham, Mich. 48010**

**Continuation-in-part of Ser. No. 702,595, Feb. 19, 1985, Pat. No. 4,608,972. This application Dec. 23, 1985, Ser. No. 812,281**

**Int. Cl.⁴ A61F *2/30***

**U.S. Cl. 623—16** **15 Claims**

**1**. The method of applying a chin implant to a human comprising;

surgically stripping tissue from frontal portions of the lower jaw mandible adjacent the chin down to the jaw bone;

centrally locating and applying an apertured drill guide to the exposed jawbone and to the undersurface of the chin with the central axis of the guide in alignment with a median plane of the mandible;

drilling through the guide a first bore into said jawbone at said median plane;

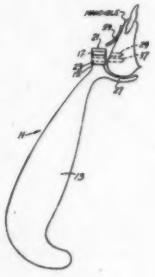
projecting a removable locking pin through the guide and

snugly into said first bore for supporting and retaining the drill guide as centered;

successively drilling through said guide a pair of laterally spaced bores into said jawbone equidistant from said median plane;

upon removal of said locking pin and guide, manually threading into each of said pair of bores, a headless self threading cortical bone screw having an axial bore, with the outer end of said screw in registry with the outer surface of said jawbone;

assembling a resilient preformed chin implant with a pair of projecting mount posts snugly against said jawbone while slidably positioning said posts into said screws respectively;



and suturing the stripped tissue back into natural position enclosing and retaining engaging said implant.

4,713,078

## METHOD FOR PRESERVING RAW HIDES, SKINS AND FURSKINS

**Dezso David; Peter Rovo; Terez Sipos nee Richter; Gyorgy Molnar; Istvan Deme, and Tamas Karnitscher, all of Budapest, Hungary, assignors to Bor-es Cipoipari Kutato-Fejleszto Vallalat and Budapesti Boripari Vallalat, both of Budapest, Hungary**

**Filed Apr. 9, 1986, Ser. No. 849,702**

**Claims priority, application Hungary, Apr. 10, 1985, 1313/85**

**Int. Cl.[4] C14C** *1/00*

**U.S. Cl. 8—94.15** **4 Claims**

1. A process for preserving untanned freshly flayed animal hides and skins which comprises: treating said hides or skins with an aqueous solution containing at least 0.1% by volume of cyanamide.

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4,713,079

## PARTICLES CONTAINING DIHALOHYDANTOIN BLEACH IN A DILUTED CORE

**Kil Whan Chun, Wyckoff, N.J., and Clemens A. Kyllmann, Chicago, Ill., assignors to Lever Brothers Company, New York, N.Y.**

**Filed Dec. 31, 1985, Ser. No. 815,413**

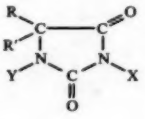
**The portion of the term of this patent subsequent to Nov. 17, 2004, has been disclaimed.**

**Int. Cl.[4] D06L** *3/00, 3/06;* **C11D** *9/42;* **A62D** *3/00*

**U.S. Cl. 8—101** **20 Claims**

1. Hard spherical bleaching particles whose composition is an intimately dispersed mixture having a core comprising:

(i) from about 1 to about 90% by weight of said core of dihalohydantoin having the molecular structure:



where

R and R′ may be the same or different and selected from $C_1$–$C_{12}$ alkyl, benzyl, aryl or $C_1$–$C_{12}$ alkyl substituted benzyl or aryl groups; and

X and Y may be the same or different and chosen from chlorine or bromine;

(ii) from about 1 to 90% by weight of said core of a buffering salt; and

(iii) from about 0.5 to 60% by weight of said core of an organic binder;

wherein the pH of said core is less than 9.5 when dissolved in water.

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4,713,080

## METHOD AND COMPOSITION FOR THE DYEING OF HAIR WITH 2,6-DIAMINO-PYRIDINE DERIVATIVES

**Eugen Konrad, Darmstadt, and Thomas Clausen, Alsbach, both of Fed. Rep. of Germany, assignors to Wella Aktiengesellschaft, Darmstadt, Fed. Rep. of Germany**

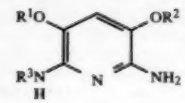
**Filed Jul. 7, 1986, Ser. No. 882,634**

**Claims priority, application Fed. Rep. of Germany, Aug. 28, 1985, 3530732**

**Int. Cl.[4] A61K** *7/13*

**U.S. Cl. 8—408** **13 Claims**

1. Composition for the oxidative coloration of hair, based upon 1.0 to 5.0 by weight of a developer substance-coupler substance combination, comprising an effective amount of a developer substance and as a coupler substance 0.01 to 3.0% by weight of at least one 2,6-diaminopyridine derivative according to Formula I:



(I)

wherein $R^1$ and $R^2$ are the same or different and are each $CH_3$ or $C_2H_5$ and $R^3$ is hydrogen, $C_1$–$C_4$-alkyl or $C_1$–$C_4$-hydroxyalkyl, or a physiologically compatible salt thereof.

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4,713,081

## STABLE AQUEOUS DYESTUFF PREPARATIONS OF FINELY DISPERSED WATER-INSOLUBLE OR SPARINGLY WATER-SOLUBLE DYES

**Carl Becker, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation-in-part of Ser. No. 917,709, Jun. 21, 1978, abandoned. This application Apr. 23, 1979, Ser. No. 32,431**

**Claims priority, application Switzerland, Nov. 23, 1977, 14346**

**Int. Cl.[4] B41M** *5/26;* **D06P** *1/22, 3/54;* **C09K** *11/06*

**U.S. Cl. 8—527** **46 Claims**

1. An aqueous dyestuff preparation of a water-insoluble or sparingly water-soluble dye having a particle size of less than 10μ which contains at least 10% by weight of water, 10 to 60% by weight, of a finely dispersed water-insoluble or sparingly water-soluble dye, 0.1 to 5% by weight of a ligninsulphonate and 0.5 to 5% by weight of a non-ionic copolymer of ethylene oxide and propylene oxide, said copolymer having an ethylene oxide content of at least 65% by weight and a molecular weight of more than 12,000.

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4,713,082

## PROCESS FOR DYEING OR PRINTING TEXTILE FIBRE MATERIALS WITH REACTIVE DYE CONTAINING VINYL SULFONYL-TYPE GROUP AND CHLORO-TRIAZINYL AMINO GROUP

**Peter Scheibli, Bottmingen, and Karl Seitz, Oberwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

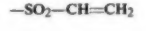
**Continuation of Ser. No. 771,127, Aug. 30, 1985, abandoned. This application Aug. 20, 1986, Ser. No. 898,797**

**Claims priority, application Switzerland, Aug. 30, 1984, 4154/84**

**Int. Cl.[4] C09B** *62/04;* **D06P** *1/38, 3/66*

**U.S. Cl. 8—549** **9 Claims**

1. A process for dyeing or printing a textile fibre material selected from the group consisting of silk, leather, wool, polyamide, polyurethane and cellulose fibre materials with reactive dyes, which comprises dyeing or printing said fibre material with a reactive dye which contains at least one radical of the formula



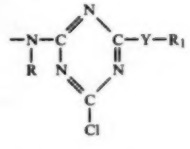
(1a)

or



(1b)

and at least one radical of the formula



(2)

in which X is an inorganic or organic radical detachable under alkaline conditions, R is hydrogen or substituted or unsubsti-

tuted $C_{1-4}$-alkyl, Y is oxygen or sulfur and $R_1$ is alkyl of 1 to 7 carbon atoms which is unsubstituted or further substituted by halogen, hydroxyl, cyano, alkoxy, carboxyl, sulfo or a reactive radical, or is unsubstituted alkyl of 7 to 20 carbon atoms, methoxycarbonylmethyl, ethoxycarbonylmethyl, β-ethoxy-β-ethoxy-ethyl or cyclohexyl, and the dye is a metal-free monoazo or secondary disazo dye, a primary disazo dye in which the diazo component to which a radical of the formula (2) is bonded is coupled in the ortho-position to an amino group, or an anthraquinone, phthalocyanine, formazan, azomethine, dioxazine, phenazine, stilbene, triphenylmethane, xanthene, thioxanthone, pyrenquinone or perylenetetracarbimide dye, except 1-[2'-chloro-4'-methoxy-triazinyl-(6')]amino-7-[1''-sulfo-5''-β-sulfatoethylsulfonyl-naphthyl-(2'')]azo-8-hydroxy-naphthalene-3,6-disulfonic acid.

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**4,713,083**

## ALCOHOLIC SOLUTION OF SULPHONIC ACID-CONTAINING COPOLYMER DYED WITH BASIC DYE

**Shuichi Okuzono, Shinnanyo; Tetsuo Tanaka, Hofu; Yasuhiro Oda, Tokuyama; Takashi Shintani, Tokuyama, and Noriaki Emura, Tokuyama, all of Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shinnanyo, Japan**

**Filed Jul. 3, 1985, Ser. No. 751,595**

**Claims priority, application Japan, Jul. 6, 1984, 59-138971**

**Int. Cl.[4] C09B** *67/34, 69/10;* **C09D** *11/10;* **C08F** *2/44*

**U.S. Cl. 8—557** **8 Claims**

1. A coloring material comprising a solution of an alcohol-soluble copolymer having a sulphonic acid group or a salt thereof, which is dyed with a basic dye, in a solvent comprising an alcohol as a main component;

said copolymer being derived from (i) 0 1% to 40% by weight of at least one ethylenically unsaturated sulphonic acid or salt thereof selected from the group consisting of styrene-sulphonic acid, vinylbenzyl-sulphonic acid, vinyl-sulphonic acid, allyl-sulphonic acid, methallyl-sulphonic acid, acryloyloxyethyl-sulphonic acid, acryloyloxyethyl-sulphonic acid, methacryloyloxypropyl-sulphonic acid an 2-acrylamido-2-methylpropane-sulphonic acid, and the lithium, sodium, potassium or ammonim salts of said unsaturated sulphonic acids, and (ii) 60 to 99.9% by weight of at least one copolymerizable monomer composed of, based on the weight of the copolymerizable monomer, 60% to 100% by weight of at least one monomer selected from the group consisting of hydoxyethyl acrylate, hydroxyethyl methacrylate, hydroxyporpyl acrylate, hydroxyethyl methacrylate, polyethylene glycol monomethacrylate, ethyl acrylate, ethyl methacrylate, porpyl acrylate, porpyl methacrylate, butyl acrylate and butyl methacrylate, and 0% to 40% by weight of other copolymerizable monomer; and

the concentration of said alcohol-soluble copolymer in the solution being in the range of 1% to 50% by weight.

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**4,713,084**

## ALGINATE GEL PARTICLE INKS OR DYE LIQUORS FOR IMPARTING COLOR TO TEXTILES

**Walter J. Bohrn, Lancaster; Robert D. Lewis, Landisville, both of Pa., and William A. Moggio, Ocean City, N.J., assignors to Armstrong World Industries, Inc., Lancaster, Pa.**

**Continuation-in-part of Ser. No. 607,798, May 7, 1984, abandoned. This application Oct. 24, 1985, Ser. No. 790,822**

**Int. Cl.[4] C09B** *67/00;* **D06P** *5/00*

**U.S. Cl. 8—561** **25 Claims**

1. Gel particles for imparting color to textiles produced by mixing a first composition comprising alginic acid or an alginic acid derivative with a second composition comprising a gel agent for the first composition, at least one of said compositions also containing a dye, whereby the alginic acid or alginic acid derivative of said first composition and the gel agent of said second composition react forming a suspension of gel particles in water, said gel particles comprising said dye, having a particle size dimension of from about 1/32 to about ¼ inch and being water insoluble and non-liquifiable within a temperature range of from about ambient temperature up to at least 300° F. and wherein said gel agent is comprised of a mixture of a monovalent chloride salt and a polyvalent metal salt other than magnesium.

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**4,713,085**

**Patent Not Issued For This Number**

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**4,713,086**

## OIL-COMPATIBLE COAL/WATER MIXTURES

**Francis J. Smit, Arvada; William E. Horst, and Anirudh K. Bhasin, both of Golden, all of Colo., assignors to Amax Inc., Greenwich, Conn.**

**Filed Mar. 2, 1984, Ser. No. 585,661**

**Int. Cl.[4] C10L** *1/32*

**U.S. Cl. 44—51** **13 Claims**

1. A method for inhibiting the increase in viscosity of a coal/water slurry when brought into transitional contact with petroleum oil during fuel changeover while operating, a power generation system in which the changeover occurs from petroleum oil to coal/water slurry or from coal/water slurry to petroleum oil which comprises,

causing transitional contact to occur between said coal/water slurry and said petroleum oil during fuel changeover in a power generation system while maintaining in said coal/water slurry during transitional contact with petroleum oil an effective amount of at least about 0.2% by weight of an agglomeration-inhibiting agent selected from the group consisting of nonionic and anionic dispersing agents, the amount being sufficient to thereby inhibit the formation of coal/oil agglomerates and provide a flowable mixture during transitional contact characterized by a Brookfield viscosity of less than about 50,000 cP, and continuing to operate said power generation system following fuel changeover.

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**4,713,087**

## CARRIER COMPOSITION FOR INTRODUCING ADDITIVES TO A MOTOR FUEL

**Robert H. Jenkins, Jr., Walden; Edward Mitchell, Hopewell Junction; Frank J. Gaetani, Poughkeepsie; John J. Mahusky, Marlboro, and Marilyn Hall, Poughkeepsie, all of N.Y., assignors to Texaco Inc., White Plains, N.Y.**

**Filed Oct. 14, 1986, Ser. No. 918,205**

**Int. Cl.[4] C10L** *1/16, 1/18*

**U.S. Cl. 44—53** **8 Claims**

1. A diluent composition effective for solubilizing a motor fuel additive to form a motor fuel additive concentrate solution, said solution being characterized by having a relatively high flash point, a low viscosity and solution stability at temperatures below 0° F., said diluent composition comprising a mixture of hydrocarbons in the avjet boiling range and primary amyl alcohol in the proportion of from 3–6 parts by weight of said mixture of hydrocarbons per part by weight of said primary amyl alcohol.

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**4,713,088**

## MIDDLE DISTILLATE COMPOSITIONS WITH IMPROVED COLD FLOW PROPERTIES

**Robert D. Tack, Abingdon, Sarah L. Pearce, Wantage, both of United Kingdom, and Albert Rossi, Warren, N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.**

**Filed Feb. 20, 1985, Ser. No. 703,339**

**Claims priority, application United Kingdom, Feb. 21, 1984, 8404518; Aug. 10, 1984, 8420435**

**Int. Cl.[4] C10L** *1/14*

**U.S. Cl. 44—62** **15 Claims**

1. A distillate petroleum fuel oil boiling in the range of 120° to 500° C. having a cold flow property improving amount of a copolymer present therein, said copolymer consisting essentially of polyvinylester containing at least 25 weight percent of repeating monomer units of monoethylenically unsaturated $C_4$ to $C_8$ mono- or dicarboxylic acids esterified with at least 2

different n-alkyl groups wherein (1) said n-alkyl groups have an average number of carbon atoms of from 12 to 14; (2) no more than 10 wt. % of said esterified monomer units contain n-alkyl groups having more than 14 carbon atoms; and (3) no more than 20 wt. % of said esterified monomer units contain n-alkyl groups having fewer than 12 carbon atoms.

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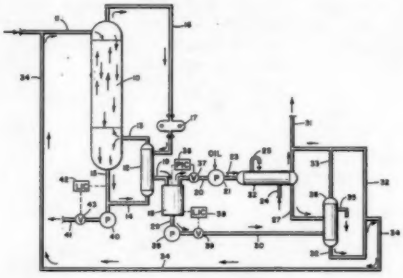
**4,713,089**

## SYSTEM AND METHOD FOR REMOVING VOLATILE COMPONENTS FROM AN AQUEOUS MEDIUM

**Lanny A. Robbins, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Jul. 18, 1986, Ser. No. 886,693**
**Int. Cl.[4] B01D *19/00***
**U.S. Cl. 55—52** **4 Claims**



**2.** A method for removing volatile components from an aqueous medium, comprising the steps of:

passing into a column an aqueous medium containing volatile components, and steam as a vaporizing gas;

flowing the aqueous medium and the steam vapor through the column countercurrent to each other;

contacting the aqueous medium with the steam vapor to vaporize the volatile components, and causing a negative pressure condition in the column;

passing the steam vapor containing the volatile components into a vapor compressor, and compressing the steam vapor to raise its pressure to a point below atmospheric pressure;

passing the pressurized steam vapor into a first condenser, to condense part of the vapor phase, and thereby form a liquid phase and a vapor phase;

passing the liquid phase and vapor phase into a receiver vessel, to separate these phases, such that the liquid phase contains water and the condensed volatile components, and the vapor phase contains noncondensable components;

passing the vapor phase from the receiver vessel into a vacuum pump to raise the pressure of this phase to atmospheric pressure;

passing the liquid phase from the receiver vessel into a decanter vessel;

passing the vapor phase from the vacuum pump into a second condenser, to condense part of the vapor phase, and thereby form a liquid phase and a vapor phase;

discharging the vapor phase from the second condenser;

passing the liquid phase from the second condenser into the decanter vessel, to separate part of the condensed volatile components from the water phase;

discharging the condensed volatile components from the decanter vessel; and

discharging the water phase containing the remaining condensed volatile components from the decanter vessel.

**4,713,090**

## ADSORBENT FOR SEPARATION-RECOVERY OF CO, PREPARING METHOD THEREOF AND PROCESS FOR SEPARATION-RECOVERY OF HIGH PURITY CO, USING THE ADSORBENT

**Jintaro Yokoe; Masami Takeuchi, and Toshiaki Tsuji, all of Amagasaki, Japan, assignors to Kansai Netsukagaku Kabushiki Kaisha, Hyogo, Japan**

**Filed Sep. 16, 1986, Ser. No. 907,915**
**Claims priority, application Japan, Sep. 17, 1985, 60-205972**
**Int. Cl.[4] B01D *53/04***
**U.S. Cl. 55—68** **20 Claims**

**16.** A process for separation-recovery of high purity CO from any mixed gas containing CO by the method of pressure swing adsorption and/or temperature swing adsorption, which comprises using as the adsorbent a composite carrier (X) composed of a carrier (a) formed of silica and/or alumina as its nucleus and an active carbonized material layer (b) formed on the surface thereof, on which a copper compound (Y) is carried.

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**4,713,091**

## ADSORPTION OF GASES BY AMINE AND PHOSPHINE COMPLEXED MN(II) AND COMPOUNDS

**Rakesh Govind, Cincinnati, Ohio, assignor to University of Cincinnati, Cincinnati, Ohio**

**Continuation-in-part of Ser. No. 792,972, Oct. 30, 1985, Pat. No. 4,668,255. This application Oct. 20, 1986, Ser. No. 918,701**
**Int. Cl.[4] B01D *53/14***
**U.S. Cl. 55—73** **12 Claims**

**1.** A method of sorbing a gas comprising contacting a manganese (II) complex with said gas at an effective temperature and pressure whereby said gas is sorbed by said manganese (II) complex;

wherein said gas is selected from the group consisting of oxygen, nitrogen oxides, sulfur dioxide, carbon monoxide, carbon dioxide, and $C_2$–$C_5$ alkenes;

said manganese (II) complex having the following general formula:

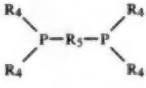
$$MnLX_2$$

wherein L represents a diphosphine ligand sensitive to a compound selected from the group consisting of oxygen, nitrogen oxides, carbon monoxide, carbon dioxide, sulfur dioxide and $C_2$–$C_5$ alkenes and X represents an anion.

**11.** A compound having the following general formula:

$$Mn(II)LX_2 \text{ wherein}$$

L represents a diphosphine ligand having the following general formula:



wherein $R_4$ represents the same or different radicals selected from the group consisting of substituted and unsubstituted alkyl, cycloalkyl, aryl, alkyaryl, arylalkyl and hydrogen; and

$R_5$ represents a radical selected from the group consisting essentially of alkylene and arylene.

4,713,092

## ELECTROSTATIC PRECIPITATOR

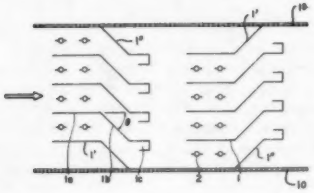
Yoshikazu Kikuchi, Tokyo, and Reiro Nakao, Kawaguchi, both of Japan, assignors to Corona Engineering Co., Ltd., Japan

Continuation of Ser. No. 765,036, Aug. 12, 1985, abandoned. This application Feb. 19, 1987, Ser. No. 16,992

Claims priority, application Japan, Aug. 14, 1984, 59-168892

Int. Cl.[4] B03C *3/12, 3/14, 3/45*

U.S. Cl. 55—130 10 Claims



1. A device for collecting particles floating in a gas, comprising:

a flow channel for flowing said gas in a predetermined direction;

corona charging means for charging at least partly said particles floating in said gas flowing through said channel thereby causing said particles to be agglomerated at least partly, said charging means being located inside of said flow channel and including at least a pair of parallel electrode means spaced apart from each other over a predetermined distance and each arranged in parallel with said predetermined direction and at least one corona electrode means disposed between said pair of parallel electrode means;

deflecting means disposed downstream of said corona charging means for deflecting said gas such that said gas flows generally in a direction other than said predetermined direction thereby causing particles in said deflected gas to impinge on said deflecting means due at least partly to inertia; and

collecting means disposed downstream of and formed continuously with said deflecting means to define a local negative pressure region, said collecting means having in a horizontal plan view a generally inverted C-shaped cross section whose upstream end is connected to said deflecting means and which is all located at a downstream side with respect to an imaginary line defined as a trailing extension of said deflecting means, for collecting at least said particles moving along said deflecting means, said collecting means guiding said particles thus collected to be transported by force of gravity to a desired position without being reentrained in the flowing gas.

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4,713,093

## ELECTROSTATIC DUST PRECIPITATOR

Curt Hansson, Västra Frölunda, Sweden, assignor to Kraftelektronik AB, Surte, Sweden

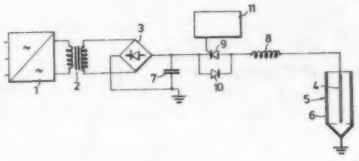
Filed Jul. 8, 1986, Ser. No. 883,356

Claims priority, application European Pat. Off., Jul. 15, 1985, 85850238.8

Int. Cl.[4] B03C *3/02*

U.S. Cl. 55—139 1 Claim

1. An electrostatic dust precipitator comprising a separation filter having emitter ad collector electrodes means connected to said electrodes for maintaining a pre-determined substantially constant d.c. voltage therebetween during operation of the precipitator, and pulse-generating means connected to the electrodes for generating at a given frequency in the order of 30–500 Hz voltage pulses or voltage pulse trains which are superimposed on said d.c. voltage and which are of short duration in relation to said frequency, said pulse-generating means including capacitive ad inductive elements connected in a manner to form, together with a capacitance provided by the separation filter, an electrical oscillation circuit, and a switching device which is incorporated in said oscillation circuit and which is periodically actuatable by a control means for activation of the oscillation circuit, wherein the pulse-generating means upstream said oscillation circuit further includes a voltage-controlled frequency converter arranged to generate an a.c. voltage having a frequency which is at least three times higher than the frequency of said voltage pulses or trains of pulses, and a single-phase transformer connected downstream of said converter and followed by a rectifier.



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4,713,094

## AIR DRIER APPARATUS

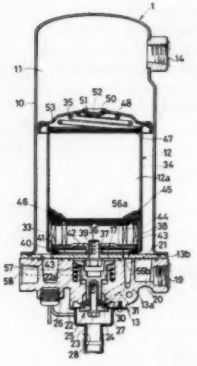
Ichiro Yanagawa, and Yuji Wachi, both of Higashimatsuyama, Japan, assignors to Jidosha Kiki Co., Ltd., Japan

Filed Aug. 25, 1986, Ser. No. 900,316

Claims priority, application Japan, Aug. 28, 1985, 60-130968[U]; Aug. 30, 1985, 60-132681[U]; Aug. 30, 1985, 132682[U]

Int. Cl.[4] B01D *53/04*

U.S. Cl. 55—163 11 Claims



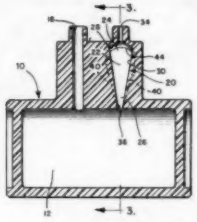
1. In an air drier apparatus including a housing having an open bottom end, a drying agent storage casing disposed within said housing, and a bottom end cover blocking the open bottom end of said housing, said air drier apparatus being adapted to dry compressed air supplied through an air inlet port formed on said bottom end cover with drying agent charged within said casing; the improvement whereby the bottom portion of said drying agent storage casing is mounted securely upon said bottom end cover, said improvement comprising, in combination, a securing plate means positioned within said bottom portion of said drying agent storage casing, said securing plate means having a lock nut incorporated thereon and a single bolt means engaging said lock nut and clamping said bottom portion of said drying agent storage casing to said bottom end cover.

4,713,095

## LIQUID SEPARATOR FOR GAS ANALYZER

Robert H. Ricciardelli, Waukesha, Wis., assignor to Criticare Systems, Inc., Milwaukee, Wis.

Filed Oct. 16, 1986, Ser. No. 919,894
Int. Cl.[4] B01D *19/00*
U.S. Cl. 55—189 25 Claims



1. A liquid separator for a gas analyzer, said separator comprising:

means for defining a separation chamber comprising an upper zone and a lower zone;

inlet means for introducing a gas/liquid mixture into the separation chamber;

gas outlet means for removing gas from the upper zone; and liquid outlet means for removing liquid from the lower zone;

said upper zone bounded upwardly by an upper surface which surrounds the gas outlet means;

said lower zone bounded downwardly by a lower surface which surrounds the liquid outlet means;

said upper surface concavely shaped to drain liquid away from the gas outlet means into the lower zone;

said lower surface defining a plurality of facets which define a plurality of internal corners, wherein at least a portion of the internal corners converge toward the liquid outlet means to draw liquid by capillary action away from the upper zone toward the liquid outlet means;

said gas outlet means separated from the closest one of the internal corners by a distance greater than 0.05 inches, said separation chamber having a volume less than 1 milliliter.

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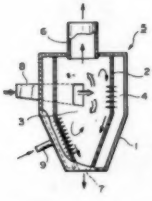
4,713,096

## APPARATUS FOR SEPARATING GRANULAR SOLIDS FROM CARRYING GAS

Isamu Kajihara, Yokosuka, Japan, assignor to Morinaga & Co., Ltd., Tokyo, Japan

Filed May 9, 1986, Ser. No. 861,182
Int. Cl.[4] B01D *53/24*
U.S. Cl. 55—204 4 Claims



1. In a cyclone separator for separating granular solids from a carrying gas thereof, having a cylindrical main body provided with a downwardly gradually reducing-diameter lower portion; mixture gas inlet for introducing a mixture gas consisting of granular solids and a carrying gas thereof into said main body, said mixture gas inlet being tangentially directed to a side wall of said main body; a gas outlet for discharging said carrying gas having been separated from said granular solids, said gas outlet being provided in an upper portion of said main body; and a granular solid outlet for discharging said granular solids having been separated from said carrying gas thereof,

the improvement wherein a front end of said gas outlet is slightly projected into said main body; and said mixture gas inlet is provided in a side wall of said main body at a position spaced downward apart from a ceiling portion of said main body by a distance enabling said mixture gas to make at least one swirl above said mixture gas inlet when introduced into said main body.

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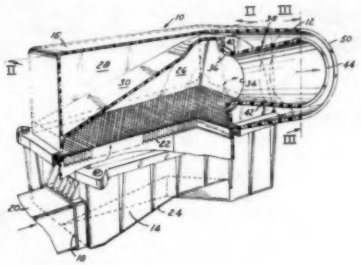
4,713,097

## INTEGRATED ENGINE AIR CLEANER AND VENTURI RESONATOR

Franklin L. Grawi, Southfield, and Michael B. Magnan, Dearborn, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Feb. 27, 1987, Ser. No. 19,990
Int. Cl.[4] B01D *46/00*
U.S. Cl. 55—276 4 Claims



1. An air cleaner-engine induction noise silencer combination for a motor vehicle type internal combustion engine, comprising an air cleaner housing having first and second parts defined by an air filter element located between, an ambient air inlet into the first part, a clean air outlet in the second part, means including a venturi connecting the outlet to the filter, and a noise reducing resonator cooperating with the outlet to suppress engine induction noise feedback, the resonator including a closed chamber having an inlet thereto concentric with the air outlet and radially spaced therefrom for the dissipation of sound waves therebetween into the chamber, the venturi having a gradually tapering diffuser gradually increasing in area from the throat of the venturi towards the outlet to provide efficient operation through maximum air flow pressure recovery while concurrently further reducing the acoustic energy of the engine induction noise by reflecting the same off the tapering walls of the venturi back towards the engine.

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4,713,098

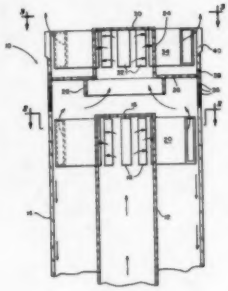
## TANDEM CURVED ARM STEAM-WATER SEPARATOR

Nick Idvorian, St. Catharines, and Robert H. Renshaw, Grimsby, both of Canada, assignors to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Jan. 31, 1986, Ser. No. 825,556
Int. Cl.[4] B01D *45/00*
U.S. Cl. 55—345 7 Claims

1. A steam-water separator comprising a first stage riser adapted to receive a steam-water mixture, baffle means disposed in a spaced relation to said riser, at least one discharge slot formed through said riser, an arcuate discharge member registering with each slot for receiving said mixture and discharging it against said baffle means to promote the separation of water from said mixture, said water collecting on said baffle means and said mixture rising by buoyant forces, a second stage riser disposed above said first stage riser, means for directing said rising mixture into said second stage riser, addi-

tional baffle means disposed in a spaced relation to said second stage riser, at least one discharge slot formed through said second stage riser, and an arcuate shaped discharge member registering with each latter slot for receiving said riser mixture



and discharging it against said baffle means to facilitate additional separation of water from said mixture, said water collecting on said additional baffle means and said mixture rising by buoyant forces for further treatment.

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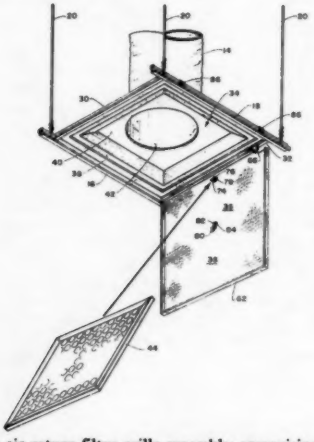
**4,713,099**

## MOLDED FIBERGLASS AIR RETURN FILTER GRILLE

**Clifford A. Schroeder, 904 Skelton Canyon Circle, Westlake, Calif. 94015**

**Filed Jun. 5, 1986, Ser. No. 871,092**
**Int. Cl.[4] B01D** *46/10*
**U.S. Cl. 55—385 R** **13 Claims**



1. An air return filter grille assembly comprising;
a molded fiberglass plenum having an open side surrounded by a skirt;
a filter receiving recess formed in said molded fiberglas plenum for receiving a filter;
filter means positioned in said recess;
a perforated faceplate fitting the open side of said plenum;
hinge means hingedly mounting said perforated faceplate on said fiberglass plenum so that said perforated faceplate can be easily swung open to remove and replace said filter means;
said perforated faceplate constructed and arranged to hold said filter in said recess when closed; and
latch means on said perforated faceplate for holding said faceplate in a closed position against said open side of said molded fiberglass plenum;
whereby filters may be easily removed and replaced by unlatching said perforated faceplate, placing a filter on said perforated faceplate and closing and latching said faceplate.

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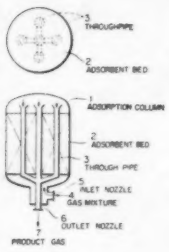
**4,713,100**

## ADSORPTION APPARATUS

**Kazuo Haruna, Kakogawa, and Iwamitsu Shiozawa, Hyogo, both of Japan, assignors to Seitetsu Kagaku Co., Ltd., Hyogo, Japan**

**Filed Jun. 25, 1986, Ser. No. 879,753**
**Int. Cl.[4] B01D** *53/04*
**U.S. Cl. 55—387** **3 Claims**




1. An industrial scale adsorption apparatus for separating a gas mixture into its components by pressure swing adsorption, comprising:
a closed vessel, having an inlet nozzle at one end for admitting said gas mixture;
an adsorbent bed retained inside said vessel; and,
a plurality of unrestricted passages extending vertically in said vessel through entire height of said adsorbent bed, each of said passages being open at one end above said bed for admitting an unadsorbed gas, all said passages discharging inside said closed vessel, into one common outgoing passage being in communication with an outlet nozzle.

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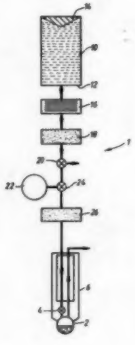
**4,713,101**

## COOLING APPARATUS

**David J. Spring, Slough, England, assignor to Graviner Limited, Essex, England**

**Filed Apr. 15, 1986, Ser. No. 852,204**
**Claims priority, application United Kingdom, Apr. 16, 1985, 8509738; Dec. 9, 1985, 8530306**
**Int. Cl.[4] F25J** *1/00*
**U.S. Cl. 62—8** **13 Claims**



1. A Joule-Thomson effect cooler including

a supply of high pressure gas having an outlet, said supply including a chemical, pyrotechnic composition operable to generate a pure gas, and a device operatively associated with said composition to initiate combustion thereof and thereby to initiate gas generation from said composition and supply of said gas from said outlet, the temperature of the gas being above its inversion temperature,

a throttle having an inlet and an outlet,

a cool chamber having an inlet connected to the outlet of said throttle, and an outlet,

a heat exchanger operatively connected to cool the gas passing to said inlet of said throttle, said heat exchanger being operatively connected to said outlet from said cool chamber, and

filter means operatively connecting said outlet of said gas supply to said inlet of said throttle, the filter means performing a cooling as well as a filtering action and cooling the gas to below its inversion temperature,

whereby the gas arriving at the inlet of the throttle is free of impurities capable of significantly reducing flow through said throttle.

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**4,713,102**

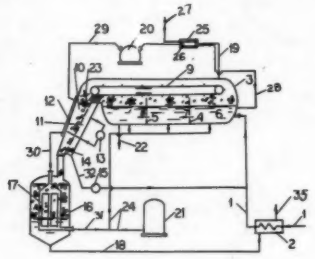
## METHOD OF CONCENTRATING MULTICOMPONENT LIQUID PRODUCTS

**Boris M. Khudenko, and Jack Zbar, both of Atlanta, Ga., assignors to Insta, Inc., Atlanta, Ga.**

**Continuation-in-part of Ser. No. 657,580, Oct. 4, 1984, abandoned. This application Aug. 18, 1986, Ser. No. 897,326**

**Int. Cl.[4] B01D** *9/04;* **C02F** *1/22*

**U.S. Cl. 62—535** **17 Claims**



1. A method of concentrating multicomponent liquid product containing volatile and nonvolatile constituents comprising the steps of:

mixing said multicomponent liquid product and a liquid refrigerant gas in at least one freezing chamber;

forming crystals of ice containing entrained multicomponent liquid product by means of vaporization of said refrigerant gas;

applying heat to said crystals of ice containing entrained multicomponent liquid product so that said entrained multicomponent liquid product is separated from said crystals of ice;

collecting said separated entrained multicomponent liquid product;

recirculating said separated entrained multicomponent liquid product to said at least one freezing chamber;

removing volatilized constituents of said multicomponent liquid product and said vaporized liquid refrigerant gas to said freezing chamber, recirculating said volatilized constituents of said multicomponent liquid product and said vaporized liquid refrigerant gas to said freezing chamber so that said volatilized constituents and said vaporized liquid refrigerant gas is mixed with said multicomponent liquid product; and

removing said multicomponent liquid product from said freezing chamber.

**4,713,103**

## METHOD OF AND A DEVICE FOR APPLYING A PRIMARY COATING TO AN OPTICAL FILAMENT

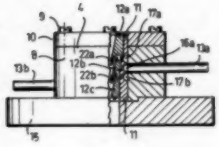
**Risto Pennanen, and Jyrki Pennala, both of Helsinki, Finland, assignors to Oy Nokia AB, Helsinki, Finland**

**Filed Dec. 5, 1986, Ser. No. 938,252**

**Claims priority, application Finland, Dec. 17, 1985, 855012**

**Int. Cl.[4] C03B** *37/023;* **B05D** *5/06*

**U.S. Cl. 65—3.11** **10 Claims**



1. A method of applying a primary coating to an optical filament by passing a filament coming from a drawing furnace through a coating crucible into which a coating material is fed for applying it to the surface of the filament and by passing the coated filament, after the coating is hardened, over an idler wheel through a drawing apparatus on to a coil, wherein

the flow of the coating material to be introduced into the coating crucible is divided in the crucible into two flows opposite in direction and advancing in the peripheral direction of the crucible;

the two flows are caused to flow in the axial direction substantially on the opposite sides of the crucible;

the axial flows are caused to flow in the peripheral direction of the crucible, joined by means of an outer channel extending around the crucible in the peripheral direction, and passed radially through throttle openings into an inner peripheral channel; and

the material is passed from the inner peripheral channel through a peripheral throttle slot into a conical channel along which the material is guided into a central chamber of the crucible, through which chamber the filament is drawn.

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**4,713,104**

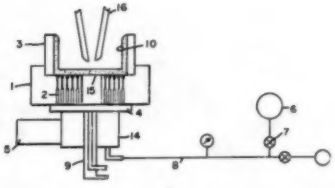
## QUARTZ GLASS CRUCIBLES

**David R. Brown, Beverly, Mass.; Charles E. Frost, Jr., Exeter, and Kenneth A. White, Raymond, both of N.H., assignors to GTE Products Corporation, Stamford, Conn.**

**Filed Mar. 31, 1986, Ser. No. 846,190**

**Int. Cl.[4] C03B** *19/04*

**U.S. Cl. 65—18.1** **2 Claims**



1. A method of making a quartz glass crucible from granular quartz particles comprising the steps of:

providing a base having an upper flat surface thereon, the base having holes therethrough through which a vacuum can be drawn, the diameters of the holes at said upper surface being greater than can be bridged by the granular quartz particles, the holes at said upper surface being filled with a porous material through which a vacuum can be

drawn but through which the granular quartz particles will not pass;

placing an open-ended cylindrical mold on the base;

disposing a thick layer of granular quartz particles on the flat surface of the base and on the cylindrical mold;

rotating the base and cylindrical mold while drawing a vacuum on the granular quartz particles through the holes in the base, the granular quartz particles on the flat surface of the base being held in place by means of the vacuum;

heating the granular quartz particles, while maintaining the rotation and vacuum, to melt and fuse an inner portion of the thick layer of granular quartz particles to form a quartz glass crucible shape having a substantially flat bottom;

removing the quartz glass crucible shape from the base and cylindrical mold; and

machining the quartz glass crucible shape into a finished crucible.

the method including the provision that holes are provided only in the base and not in the cylindrical mold and that enough vacuum is drawn though said holes to remove bubbles from the entire mass of the quarts particles.

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**4,713,105**

## METHOD FOR GLASS FIBER SPLICING BY FLAME FUSION

**John T. Krause, New Providence; Charles R. Kurkjian, Basking Ridge, and Un-Chul Paek, Lawrenceville, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Continuation of Ser. No. 573,141, Jan. 24, 1984, abandoned. This application Nov. 25, 1986, Ser. No. 935,162**

**Int. Cl.[4] C03B** *23/20, 37/10*

**U.S. Cl. 65—4.1** **6 Claims**

1. Method for making a glass fiber which here is designated as a spliced fiber,

said method comprising a step of connecting at least a first glass fiber and a second glass fiber,

said first and said second glass fibers comprising respective surface portions which consist of at least 95 weight percent silica,

said step of connecting comprising heating an end portion of said first fiber and an end portion of said second fiber while said end portion of said first fiber is in contact and essentially aligned with said end portion of said second fiber,

said heating being in a flame which results upon combustion in a flow of gases,

said flow comprising an outer flow portion, an intermediate flow portion which is interior to said outer flow portion, and central flow portion which is interior to said intermediate flow portion,

said outer flow portion comprising at least 50 percent by volume oxygen,

said intermediate flow portion consisting essentially of chlorine,

said central flow portion consisting essentially of hydrogen or deuterium,

the velocity of the flow of said outer flow portion being greater than the velocity of the flow of said intermediate flow portion so as to render said flame more narrow and so as to cool the fiber away from said end portions, and

central flow being kept low during placement of fiber such that fiber end temperature is less than or equal to 500 degrees C. up until fiber ends are within said intermediate flow,

whereby said spliced fiber has a tensile strength which is at least 95 percent of pristine strength.

**4,713,106**

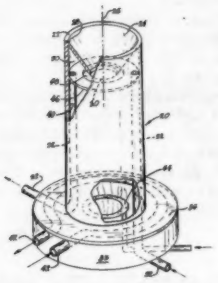
## METHOD AND APPARATUS FOR CONVEYING MOLTEN MATERIAL

**John A. McCague, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed Apr. 18, 1986, Ser. No. 853,511**

**Int. Cl.[4] C03B** *5/26*

**U.S. Cl. 65—128** **11 Claims**



9. A method of conveying molten glass from a container comprising:

(a) conveying the molten glass into the top opening of a substantially vertical standpipe;

(b) guiding the molten glass through an orifice of a fitting mounted in said standpipe, said orifice being spaced apart from interior surface of said standpipe,

(c) conveying the molten material through said standpipe to the outside of said container without substantial contact between the molten glass and said interior surface after the molten glass passes through said orifice, and

(d) cooling said fittinq to adjust the temperature of the molten glass through said orifice.

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**4,713,107**

## APPARATUS FOR PRODUCING POROUS PREFORMS FOR OPTICAL FIBERS

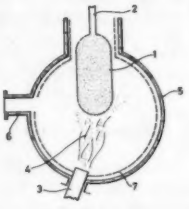
**Masaaki Yoshida; Shigeki Endo; Shigeru Kisanuki, and Hideo Kakuzen, all of Kanagawa, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Continuation of Ser. No. 720,223, Apr. 5, 1985, abandoned. This application Dec. 10, 1986, Ser. No. 940,203**

**Claims priority, application Japan, Apr. 6, 1984, 59-69569**

**Int. Cl.[4] C03B** *37/018*

**U.S. Cl. 65—157** **3 Claims**



1. An apparatus for producing a porous preform for use in producing optical fiber, said apparatus comprising: a target member (2) upon which a porous preform (1) is to be grown; an enclosure wall (5) defining a deposition chamber, said wall having an elongate passage formed therein for receiving said target member, said target member being disposed in said passage and extending into the interior of said chamber, an aperture defined ins aid enclosure wall, and a discharge outlet

(6) defined in said enclosure wall; an oxyhydrogen burner (3) for producing a flame for generating fine solid electrically charged particles of $SiO_2$ having a first electrical polarity, means for providing reactants to said burner such that said fine solid particles of $SiO_2$ are generated, said burner being disposed in said aperture in communication with the interior of said chamber such that the flame extends into said chamber, whereby some of said charged particles contact an inner surface of said enclosure wall thereby causing an electrostatic field force which is opposite in electrical polarity to said first polarity to be formed on the inner surface of said enclosure wall; and an electrically conductive metal mesh shielding member (7), disposed inside said wall and substantially surrounding said target member and the flame, said shielding member being located for and being a means for substantially preventing the electrostatic field force from exerting an attractive force on any of said particles of $SiO_2$ located within said shielding member.

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## 4,713,108
## NPK COMPLEX FERTILIZER

**Olav Kjohl, Heistad; Torstein Obrestad, Ulefoss, and Hans Groland, Porsgrunn, all of Norway, assignors to Norsk Hydro, a.s., Oslo, Norway**

**Filed Sep. 11, 1985, Ser. No. 774,716**
**Claims priority, application Norway, Sep. 12, 1984, 843606**
**Int. Cl.⁴ C05D *1/02***
**U.S. Cl. 71—32** **3 Claims**

1. A complex NPK-fertilizer manufactured by using KCl and/or $K_2SO_4$ as a potassium source, characterized in that it contains magnesium in an amount of 0.2–3.0% calculated MgO and added to the product as lightly calcined MgO having an average particle size of 0.2–3.0 mm.

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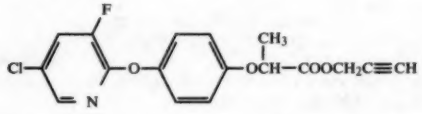
## 4,713,109
## 2-(4-(5-CHLORO-3-FLUOROPYRIDIN-2-YLOXY)-PHENOXY)-PROPIONIC ACID-PROPYNYL ESTER WITH HERBICIDAL ACTIVITY

**Rolf Schurter, Binningen, and Hermann Rempfler, Ettingen, both of Switzerland, assignors to Ciba Geigy Corporation, Ardsley, N.Y.**

**Continuation-in-part of Ser. No. 677,775, Dec. 3, 1984, abandoned, which is a continuation-in-part of Ser. No. 450,815, Dec. 20, 1982, Pat. No. 4,505,743. This application May 2, 1986, Ser. No. 858,698**
**Claims priority, application Switzerland, Dec. 31, 1981, 8372/81**
**Int. Cl.⁴ C07D *213/64;* A01N *43/40***
**U.S. Cl. 71—94** **6 Claims**

1. 2-[4-(5-Chloro-3-fluoropyridin-2-yloxy)-phenoxy]-propionic acid propynyl ester of the formula




5. A method of selectively controlling weeds which comprises applying thereto or to the locus thereof a herbicidally effective amount of 2-[4-(5-chloro-3-fluoropyridin-2-yloxy)-phenoxy]-propionic acid propynyl ester according to claim 1.

## 4,713,110
## PROCESS FOR PREPARING FINELY DIVIDED METAL POWDERS

**Borislav Bogdanovic, and Helmut Bönnemann, both of Mulheim, Fed. Rep. of Germany, assignors to Studiengesellschaft Kohle mbH, Mulheim, Fed. Rep. of Germany**

**Filed Nov. 21, 1986, Ser. No. 933,454**
**Claims priority, application Fed. Rep. of Germany, Nov. 26, 1985, 3541633**
**Int. Cl.⁴ C22B *1/00***
**U.S. Cl. 75—0.5 A** **12 Claims**

1. A process for preparing a finely divided metal powder, comprising reacting a salt of such metal with magnesium, in the presence of a solvent and a catalytic amount of a material selected from the group consisting of an anthracene, a magnesium anthracene, and a mixture of an anthracene and a magnesium anthracene.

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## 4,713,111
## PRODUCTION OF ALUMINUM-SiC COMPOSITE USING SODIUM TETRASBORATE AS AN ADDITION AGENT

**Thomas B. Cameron; Wilbur W. Swanson; John M. Tartaglia, and Thomas B. Cox, all of Ann Arbor, Mich., assignors to Amax Inc., Greenwich, Conn.**

**Filed Aug. 8, 1986, Ser. No. 894,548**
**Int. Cl.⁴ C22C *1/09***
**U.S. Cl. 75—68 R** **7 Claims**

1. The process for introducing particulate silicon carbide into molten aluminum or aluminum alloy which comprises mixing particulate silicon carbide from the group consisting of particles having an average size of about 5 to about 70 microns and fibers having an average diameter of about 0.1 to about 15 microns and a length of about 10 microns to about 5 centimeters with a dehydrated addition agent of sodium tetraborate in weight proportions of 1:1 to 2:1, introducing the resulting mixture into an aluminum or aluminum alloy bath at a temperature above the liquidus temperature of the bath in an amount of about 5% to about 40% of silicon carbide, by volume of said bath to disseminate said silicon carbide particles throught said bath and solidifying said bath to produce a composite material reinforced with silicon carbide particles or whiskers distributed in a matrix of aluminum or aluminum alloy.

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## 4,713,112
## PIGMENTARY COMPOSITION FOR THE CATHODIC PROTECTION OF METALLIC SURFACES AGAINST CORROSION, AND PROCESS FOR PREPARING SAID COMPOSITION

**Maurice Barre, 41 avenue de Chartres, 28570 Abondant, and Zdzislaw Kalewicz, 45 avenue Perronet, 92200 Neuilly-sur-Seine, both of France**

**Filed May 28, 1985, Ser. No. 737,868**
**Claims priority, application France, Jun. 5, 1984, 84 08781**
**Int. Cl.⁴ C04B *9/02, 14/00***
**U.S. Cl. 106—14.05** **9 Claims**

1. A process for preparing a pulverulent pigmentary composition intended for the cathodic protection of a metallic surface against corrosion and capable of being applied to said surface, said pigmentary composition comprising (1) a metal more anodic than the metal to be protected; and (2) a substitute metal constituting an electrically conductive compound selected from the group consisting of carbides, phosphides, nitrides, borides and silicides of iron, cobalt, nickel, molybdenum, titanium, chromium, zirconium, vanadium, tungsten, thorium, tantalum and cadmium, said process comprising preparing said substitute metal, and the metal more anodic than the metal to be protected, in the form of particles of appropriate granulometry, and provoking by mechanical grinding the deposition of a layer of said anodic metal on the surface of the particles of said substitute metal, thus obtaining product particles comprising a core of said substitute metal coated by a coating layer

constituted by the anodic metal, the coating process being continued until the thickness of the coating of anodic metal ensures the creation of an intermediate zone of diffusion of the ions between the core of said substitute metal and the outer coating layer of the anodic metal.

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**4,713,113**

## AQUEOUS INK COMPOSITION FOR INK-JET RECORDING

**Masaru Shimada, Shizuoka; Toshiyuki Kawanishi, Numazu; Kakuji Murakami, Shizuoka; Tamotsu Aruga, Numazu, and Hiroyuki Uemura, Numazu, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

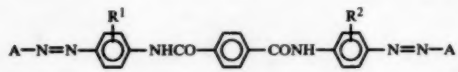
**Filed Oct. 22, 1985, Ser. No. 790,226**

**Claims priority, application Japan, Oct. 23, 1984, 59-221279**

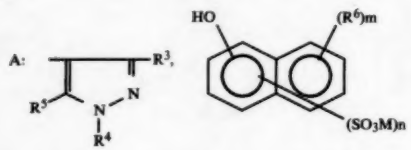
**Int. Cl.[4] C09D** *11/02*

**U.S. Cl. 106—22** **9 Claims**

**1.** An aqueous ink composition for ink-jet recording comprising an aqueous solution of a water-soluble dye of formula (I) and a humectant dissolved in water:



wherein $R^1$ and $R^2$ each represent hydrogen, an alkyl group, an alkoxy group, halogen, a carboxyl group or a sulfonic acid group; A represents



wherein $R^3$ represents an alkyl group, a phenyl group, a carbamoyl group or a carboxyl group; $R^4$ represents an unsubstituted or substituted phenyl group, an unsubstituted or substituted naphthyl group or an unsubstituted or substituted alkyl group; $R^5$ represents a hydroxyl group or an amino group; $R^6$ represents a hydroxyl group or an unsubstituted or substituted amino group; M represents hydrogen, an alkali metal cation, amine cation or an ammonium ion; m is an integer of 0 or 1; and n is an integer of 1, 2 or 3.

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**4,713,114**

## TIRE SEALING AND BALANCING COMPOSITION

**Gerald P. Smith, 1346 Zebulon Ave., Columbus, Ohio 43224**

**Continuation of Ser. No. 764,530, Aug. 12, 1985, which is a continuation of Ser. No. 544,808, Oct. 24, 1983, which is a continuation of Ser. No. 486,271, Apr. 18, 1983, which is a continuation of Ser. No. 330,045, Dec. 11, 1981, abandoned. This application Mar. 17, 1986, Ser. No. 841,034**

**Int. Cl.[4] C09K** *3/10*

**U.S. Cl. 106—33** **8 Claims**

**1.** A tire sealing and balancing composition consisting essentially of:

water;

ethylene glycol in an amount of about 50% by weight of the water;

a corrosion inhibitor;

washed mica;

short fiber asbestos having a length of about ¼ inch;

long fiber asbestos having a length of about ½ inch; and

a cellulosic thickener/filler.

**4,713,115**

## METHOD FOR DEMOLISHING DURABLE STRUCTURES

**Masao Sato, Yachiyo; Masaaki Ichimura, Tokyo, and Kunio Sato, Ichikawa, all of Japan, assignors to Sumitomo Cement Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 614,709, May 29, 1984, abandoned, which is a continuation of Ser. No. 354,648, Mar. 4, 1982, abandoned, which is a continuation-in-part of Ser. No. 208,844, Nov. 20, 1980, abandoned. This application May 23, 1985, Ser. No. 737,010**

**Claims priority, application Japan, Dec. 1, 1979, 54-154979**

**Int. Cl.[4] C04B** *7/06*

**U.S. Cl. 106—118** **12 Claims**

**1.** A method for demolishing a durable hard structrue, comprising:

forming one or more holes in a durable hard structure;

filling the holes with an aqueous slurry containing a demolition-facilitating clinker composition consisting essentially of (1) 55% to 99.9% by weight of a clinker consisting essentially of 2 to 40% by weight of a calcium-aluminoferrite solid solution, 60 to 98% by weight of both free lime and free magnesia in the ratio in weight of the free lime to the free magnesia of from 60:40 to 98.3:1.7, and not more than 6% by weight of an inevitable impurity free from $(CaO)_3Al_2O_3$ determined in accordance with Japanese Industrial Standard (JIS) R 5202, said clinker being produced, with the clinker components sintered together, at a sintering temperature of from 1200° C. to 1800° C., and (2) 0.1% to 45% by weight of a reaction moderator consisting of at least one member selected from the group consisting of (a) at least one gypsum compound selected from the group consisting of gypsum dihydrate, gypsum hemihydrate and gypsum anhydrate, said gypsum compound, in terms of gypsum anhydride, being present in said composition in an amount of 5% to 40% (b) at least one polyhydroxyl substance selected from the group consisting of sugars and polyhydric aliphatic alcohols, said polyhydroxyl substance being present in said composition in an amount of 0.1% to 5%, and (c) at least one member selected from borates of alkali metals and alkaline earth metals and mixtures of at least one of the above-mentioned borates with at least one member selected from the group consisting of organic acids and organic acids salts, said borate or mixture thereof with an organic acid or organic acid salt being present in said composition in an amount of 0.1% to 20%, each amount being based on the total weight of said demolition-facilitating clinker composition; and

leaving said clinker composition in the aqueous slurry to demolish the durable structure by the expansion force generated from a hydration reaction of said clinker composition.

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**4,713,116**

## PROTEIN MODIFIED WITH A SILANATION REAGENT AS AN ADHESIVE BINDER AND PROCESS OF PRODUCING

**Thomas L. Krinski, Granite City, Ill., and Alan L. Steinmetz, Keego Harbor, Mich., assignors to Ralston Purina Company, St. Louis, Mo.**

**Filed Jan. 2, 1987, Ser. No. 226**

**Int. Cl.[4] C08L** *89/00;* **C09J** *3/18*

**U.S. Cl. 106—154.1** **50 Claims**

**19.** A process for the production of modified vegetable protein adhesive binder comprising:

(a) forming an alkaline dispersion of a vegetable protein material having a proteinaceous solids level of at least 2% by weight, and

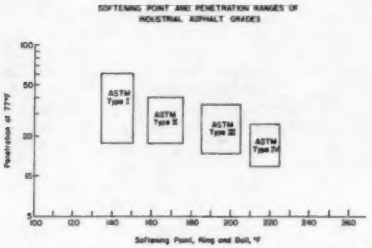
(b) treating said dispersion with a alkoxy silane reagent in an amount sufficient to modify the protein material.

4,713,117

## METHOD FOR PRODUCING INDUSTRIAL ASPHALTS WITHOUT AIR-BLOWING USING AN ORGANIC SULFONIC ACID

Judson E. Goodrich, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Oct. 31, 1984, Ser. No. 672,428
Int. Cl.[4] C08L 95/00
U.S. Cl. 106—273 R 17 Claims


SOFTENING POINT AND PENETRATION RANGES OF INDUSTRIAL ASPHALT GRADES
Penetration at 77°F
ASTM Type I
ASTM Type II
ASTM Type III
ASTM Type IV
Softening Point, Ring and Ball, °F

1. A one-step method of producing an industrial asphalt from a bituminous material consisting essentially of mixing together without air-blowing either before, during, or after said mixing:

(a) a feed material consisting essentially of a bituminous material having a viscosity of at least 50 centistokes at 350 degrees Fahrenheit, a softening point in the range of 100° to 200° F., a penetration of 30 to 150 dmm at 77° F. and wherein the feed material forms a single phase when mixed with 5 percent para-toluene sulfonic acid; and

(b) from about 0.1 to 20.0 percent by weight of an organic sulfonic acid, said mixing being done at a temperature in the range of 351 to 600 degrees Fahrenheit, whereby the softening range of the feed is substantially increased and the penetration is significantly decreased by 5 to 80 dmm at 77° F.

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4,713,118

## SOLUBILIZATION AND HYDROLYSIS OF CARBOHYDRATES

Sidney A. Barker, and Peter J. Somers, both of Birmingham, England, assignors to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 278,614, Jun. 29, 1981, abandoned. This application Dec. 14, 1983, Ser. No. 561,148
Claims priority, application United Kingdom, Jul. 11, 1980, 8022715
Int. Cl.[4] F24C 5/20; C07H 1/00; C08B 37/00, 31/00
U.S. Cl. 127—38 8 Claims

1. A process for the treatment of a glycosidically linked carbohydrate having reducing groups to produce solubilisation and hydrolysis of at least one glycosidic linkage in the carbohydrate to produce a sugar selected from the group consisting of soluble oligosaccharides and glucose, comprising contacting a glycosidically linked carbohydrate having reducing groups at a temperature within the range 50° C. to 100° C. and for a time period within the range 45 seconds to 6 hours with a mixture comprising an aqueous inorganic acid at a concentration within the range 1 to 10 molar and a compound of a metal selected from the group consisting of lithium halides, magnesium halides and calcium halides and precursors of said halides which precursors are selected from the group consisting of carbonates, bicarbonates and hydroxides, the halide being present at a concentration within the range 1 molar to saturation concentration in the acid.

4,713,119

## PROCESS FOR REMOVING ALKALI METAL ALUMINUM SILICATE SCALE DEPOSITS FROM SURFACES OF CHEMICAL PROCESS EQUIPMENT

Jonathan P. Earhart, Orinda; John A. Kostecki, Pinole, both of Calif., and Adrian C. McNutt, Rock Springs, Wyo., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Mar. 20, 1986, Ser. No. 841,989
Int. Cl.[4] C23G 1/02; B08B 9/00, 30/00
U.S. Cl. 134—3 15 Claims

1. A process for the removal of alkali metal aluminum silicate scale deposits from surfaces of chemical process equipment comprising the steps of:

(a) contacting the scale deposit with an aqueous acidic solution containing sulfuric acid, sodium bisulfate, tartaric acid, or phosphoric acid, the concentration of acid in said solution being from about 0.1 to about 2M, to dissolve aluminum-containing material from the deposit;

(b) removing the acidic stream from contact with the scale deposit;

(c) thereafter dissolving silicic acid from the scale deposit by contacting the scale deposit with an aqueous basic solution having a concentration of from about 0.5 to about 10M of a material which is sufficiently basic to dissolve silicic acid;

(d) removing the basic solution from contact with the scale deposit; and

(e) repeating steps (a) through (d) until the scale deposit is substantially removed.

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4,713,120

## METHOD FOR CLEANING A GAS TURBINE ENGINE

Henry M. Hodgens, II, Jupiter, and William A. Cellich, Boynton Beach, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Feb. 13, 1986, Ser. No. 829,044
Int. Cl.[4] C23G 1/02; C03C 23/00; B08B 9/00, 30/00
U.S. Cl. 134—3 10 Claims

1. A method for chemically dislodging deposits from the internal components of a gas turbine engine, while preserving the alloys or coatings used therein, said method comprising the steps of:

(a) contacting said deposits on said components with a cleaning composition comprising an aqueous solution of 0.1–2.0 molar hydroxylamine sulfate, a chelating agent, 0.1–4.0 molar concentration of a compound selected from the group consisting of ammonium sulfamate, sulfamide and hydroxylamine-o-sulfonic acid, and, an alkaline pH modifying substance added in an amount sufficient to achieve a pH value of from 6.5 to 14, thereby chemically dislodging said deposits from said components; and

(b) contacting said components with an amount of a rinse solution sufficient to remove said dislodged deposits and said cleaning composition from said engine.

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4,713,121

## ALKALINE RESISTANT PHOSPHATE CONVERSION COATINGS

Ronald W. Zurilla, Farmington Hills, and John Huff, Detroit, both of Mich., assignors to Parker Chemical Company, Madison Heights, Mich.

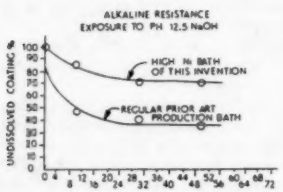
Division of Ser. No. 735,286, May 16, 1985, Pat. No. 4,681,641, which is a continuation-in-part of Ser. No. 574,851, Jan. 6, 1984, abandoned. This application Jan. 20, 1987, Ser. No. 5,180
Int. Cl.[4] C23C 2/06
U.S. Cl. 428—472.3 13 Claims

1. A method for increasing the resistance to alkaline dissolution of a phosphate conversion coating on a corrodible metal substrate, said coating being deposited by exposing said substrate to an acidic, aqueous solution containing first and second divalent metal cations and phosphate ions, the method comprising:

(a) selecting cobalt cations as said first divalent metal cations;

(b) selecting zinc cations as said second divalent metal cations;

(c) maintaining a minimum zinc ion concentration in said solution of 0.2 grams per liter; and


ALKALINE RESISTANCE
EXPOSURE TO PH 12.5 NaOH
UNDISSOLVED COATING %
HIGH Ni BATH OF THIS INVENTION
REGULAR PRIOR ART PRODUCTION BATH

(d) controlling the concentrations of said first and said second divalent metal cations in said solution so that the concentration of said cobalt cations is maintained at the time of coating between about 65 and about 95 mole percent of the total first and second divalent metal cations in said solution.

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**4,713,122**

## PRODUCTION OF THIN FLAT ARTICLES WITH HARDENED SURFACES

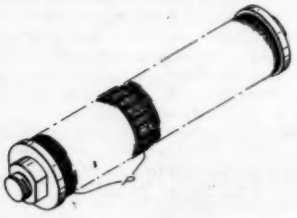
**Cyril Dawes, Sutton Coldfield, and Colin G. Smith, Solihull, both of England, assignors to Lucas Industries Public Limited Company, Birmingham, England**

**Filed Mar. 18, 1986, Ser. No. 840,778**

**Claims priority, application United Kingdom, Mar. 20, 1985, 8507230**

**Int. Cl.[4] C21D *1/74***

**U.S. Cl. 148—16.6** **15 Claims**



1. A method of treating a plurality of thin metal articles so as to increase their hardness and wear resistance, the method comprising subjecting the articles to a nitriding treatment to provide the articles with a hardened surface but which nitriding treatment tends to distort the shape of the articles, and then subjecting them to a heat treatment to correct distortion caused by the nitriding treatment, wherein the nitriding treatment is arranged to provide the thin articles with an epsilon nitride layer and the heat treatment comprises subjecting the surface hardened articles to a heat treatment while they are held in a stack under compression, the heat treatment being carried out at a temperature of from about 150° C. to about 600° C. for a time sufficient to cause the distortion to be corrected without reducing the hardness of the epsilon nitride surface layer.

**4,713,123**

## METHOD OF PRODUCING EXTRA-LOW IRON LOSS GRAIN ORIENTED SILICON STEEL SHEETS

**Yukio Inokuti; Yoh Ito, and Toshihiko Funahashi, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan**

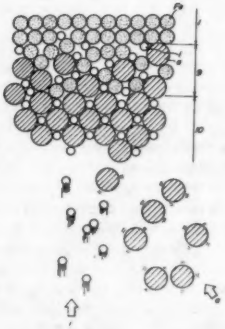
**PCT No. PCT/JP86/00087, § 371 Date Sep. 9, 1986, § 102(e) Date Sep. 9, 1986, PCT Pub. No. WO86/04929, PCT Pub. Date Aug. 28, 1986**

**PCT Filed Feb. 21, 1986, Ser. No. 907,734**

**Claims priority, application Japan, Feb. 22, 1985, 60-32935; Mar. 5, 1985, 60-42984; Mar. 5, 1985, 60-42985; Apr. 8, 1985, 60-73842; Apr. 10, 1985, 60-74460; Apr. 10, 1985, 60-74461; Apr. 10, 1985, 60-74462; Apr. 22, 1985, 60-84523; Apr. 22, 1985, 60-84525; Jul. 23, 1985, 60-161221; Jul. 23, 1985, 60-161223; Jul. 23, 1985, 60-161227; Jul. 23, 1985, 60-161228; Jul. 23, 1985, 60-161232; Aug. 16, 1985, 60-180161; Aug. 16, 1985, 60-180162; Aug. 16, 1985, 60-180163; Aug. 16, 1985, 60-180164; Dec. 17, 1985, 60-282053; Feb. 6, 1986, 61-22848; Feb. 18, 1986, 61-31764**

**Int. Cl.[4] H01F *1/04***

**U.S. Cl. 148—113** **23 Claims**



1. A method of producing an extra-low iron loss grain oriented silicon steel sheet, which comprises subjecting a silicon containing steel slab to a hot rolling, subjecting the resulting hot rolled steel sheet to one or two cold rollings with an intermediate annealing to form a cold rolled steel sheet having a given final gauge, subjecting the cold rolled steel sheet to decarburization and primary recrystallization annealing, applying an annealing separator onto the surface of the treated steel sheet, subjecting the coated steel sheet to a finish annealing and to secondary recrystallization annealing for developing secondary recrystallized grains in {110}<001> orientation and a purification annealing, removing the resulting oxide from the surface of the steel sheet, and forming on the sheet surface a thin coat of at least one layer composed mainly of at least one nitride and/or carbide of Ti, Zr, Hf, V, Nb, Ta, Mn, Cr, Mo, W, Co, Ni, Al, B and Si and strongly adhered to the surface of the silicon steel sheet through a mixed layer of the silicon steel sheet and the thin coat.

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**4,713,124**

## METHOD FOR COOLING A CHARGE AFTER THERMAL TREATMENT

**Peter Schmetz, Menden, and Dieter Gierse, Werdohl, both of Fed. Rep. of Germany, assignors to Schmetz GmbH & Co. KG Unternehmensverwaltung, Menden, Fed. Rep. of Germany**

**Division of Ser. No. 621,524, Jun. 18, 1984, Pat. No. 4,634,103. This application May 28, 1986, Ser. No. 868,299**

**Claims priority, application Fed. Rep. of Germany, Jun. 22, 1983, 3322386**

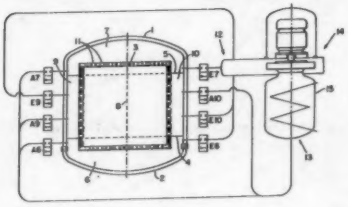
**Int. Cl.[4] C21D *1/74***

**U.S. Cl. 148—128** **1 Claim**

1. A method of cooling a charge including a number of metal workpieces after thermal treatment of the metal workpieces

within a closed chamber for then continuously and uniformly cooling the metal workpieces by blowing in a cooling gas against the metal workpieces in variable direction and variable intensity of cooling gas flow; said method comprising the steps of:

measuring the temperature distribution in said charge of the metal workpieces with temperature sensors to obtain actual values of temperature distribution in the charge of the metal workpieces; and



changing at least one of the intensity and the direction of flow of said cooling gas against the metal workpieces in all directions as a function of deviations of actual values of said measured temperatures from prescribed and desired rated values for said temperatures continuously matched and adapted as to each other in order to achieve influencing of a desired cooling speed, and to achieve influencing of substantially uniform temperature distribution to avoid dimensional distortion in said metal workpieces.

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**4,713,125**

## METHOD OF COOLING STEEL STRIP IN CONTINUOUS HEAT TREATING LINE

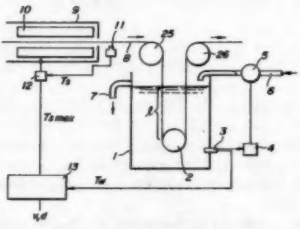
**Sachihiro Iida, Kurashiki, Japan, assignor to Kawasaki Steel Corporation, Kobe, Japan**

**Filed Mar. 20, 1986, Ser. No. 842,136**

**Claims priority, application Japan, Mar. 22, 1985, 56093/85**

**Int. Cl.[4] C21D** *11/00*

**U.S. Cl. 148—128** **4 Claims**



1. A method of cooling a steel strip which has been cooled through a final cooling zone in a continuous heat treating line comprising step of finally cooling by immersing the steel strip in cooling water within a cooling tank and passing the steel strip around one or more sink-rolls immersed in the cooling water, wherein cooling of the steel strip immersed in the cooling water prior to reaching to the first sink-roll is controlled to be cooled to such a low temperature as to prevent evaporation of a water film interposed between the surface of the first sink-roll and the surface of the strip around the first sink-roll by controlled cooling in accordance with the following formula:

$$l \geqq \frac{\rho \cdot Cp \cdot v \cdot d}{2\alpha} \ln\left(\frac{Ts - Tw}{120 - Tw}\right)$$

here,

l is the cooling length from the surface of the cooling water to the sink-roll (m)

Ts is the temperature of the steel strip at the inlet of the cooling tank (°C.)

Tw is the temperature of the cooling water (°C.)

Cp is the specific heat of the steel strip (Kcal/kg°C.)

v is the feed speed of the steel strip (m/hr)

d is the thickness of the steel strip (m)

$\alpha$ is the coefficient of heat transfer (Kcal/m hr°C.)

$\rho$ is the density of the steel strip (kg/m$^3$).

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**4,713,126**

## PROCESS FOR MANUFACTURING NEGATIVE CADMIUM ELECTRODES FOR SEALED ALKALINE BATTERY CELLS

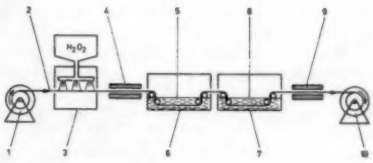
**Jurgen Woidt, and Wolfgang Fries, both of Hagen, Fed. Rep. of Germany, assignors to Varta Batterie A.G., Hanover, Fed. Rep. of Germany**

**Filed May 8, 1986, Ser. No. 861,099**

**Claims priority, application Fed. Rep. of Germany, May 28, 1985, 3519051**

**Int. Cl.[4] H01M** *10/24, 10/34*

**U.S. Cl. 148—6.14 R** **14 Claims**




1. A process for manufacturing negative cadmium electrodes for sealed alkaline battery cells, in strip form, wherein said electrodes are subjected to partial oxidation to form a charge reserve by a chemical treatment with oxidizing agents outside said cells, and wherein said process comprises the step of:

subjecting the electrode strip to treatment in an alkaline solution, after or during said partial oxidation and prior to incorporation into a cell, to decompose formed heavy metal peroxides and to hydrogenate CdO into $Cd(OH)_2$.

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**4,713,127**

## TRIPLEBASIC PROPELLANT POWDER AND PROCESS FOR THE PRODUCTION THEREOF

**Dietmar Müller, Karlsruhe, and Jürgen Kremp, Vallendar, both of Fed. Rep. of Germany, assignors to Fraunhofer-Gesellschaft zur Forderung der angewandten, Munich, Fed. Rep. of Germany**

**Filed Sep. 12, 1986, Ser. No. 907,037**

**Claims priority, application Fed. Rep. of Germany, Sep. 12, 1985, 3532525**

**Int. Cl.[4] C06B** *25/26*

**U.S. Cl. 149—98** **6 Claims**

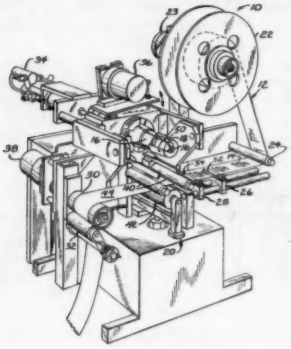
1. A process for preparing a triplebasic propellant powder, from nitrocellulose (NC), an explosive oil (NGL) and crystalline nitroguanidine (NIGU), comprising the following steps; mixing with one another the NC, NGL and plasticising the NC by means of a solvent, kneading the mixture to give solid propellant bodies adding at least one organic titanate selected from the group of monoalkoxy, chelate, quaternary, neoalkoxy, cycloheteroatom or coordinated titanates and/or at least one organic zirconate from the group of neoalkoxy zirconates to provide a proportion of $\leqq$2% by weight of such organic titanate and/or zirconate.

**4,713,128**

## MACHINE AND METHOD FOR APPLYING MINIATURIZED INDICIA TO ARTICLES

**Daniel Kerwin, 588 S. Stewart, Lombard, Ill. 60148**

**Division of Ser. No. 655,091, Sep. 27, 1984, Pat. No. 4,599,129.**
**This application Apr. 14, 1986, Ser. No. 851,224**
**Int. Cl.[4] B65C *3/16***
**U.S. Cl. 156—64** **9 Claims**



1. A method for transferring indicia from a web to an article wherein the web includes a plurality of substantially regularly spaced indicia and the article is of any varietal shape having a length of surface substantially greater than the length of each of said indicia, comprising the steps of

mounting said article on holding means for movement therewith,

continuously moving the web at a constant speed so that at times a one of said indicia is disposed adjacent the article,

pressing said web aganist the article,

continuously moving said holding means at a constant preselected velocity different from said speed of the web,

simultaneously moving said web at a rectilinear speed slower than said velocity for causing said one of said indicia to be frictionally heated to a plastic condition,

simultaneously stretching and transferring said one of said indicia permanently to the article,

stopping said holding means,

moving said web away from the article for removal thereof,

whereby the form of said one of said indicia transferred to said article is changed from a minimal to an optimal preselected size and shape.

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**4,713,129**

## PLASTIC PILE PROTECTOR AND METHOD OF COVERING A PILE WITH SAME

**James A. Inhofe, Jr., Tecumseh, and Harold J. Evans, Perkins, both of Okla., assignors to Central Plastics Company, Shawnee, Okla.**

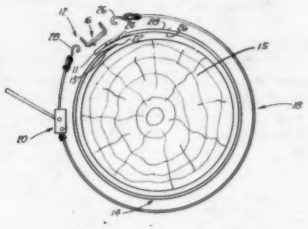
**Filed Aug. 19, 1983, Ser. No. 524,559**
**Int. Cl.[4] E04B *2/00***
**U.S. Cl. 156—71** **2 Claims**

1. A method of covering a pile with a plastic material comprising:

extending a plastic sheet having first and second ends around a pile such that said first end overlaps said second end and a strip heatable by electrical resistance heating extends therebetween;

sliding said first end over said second end until said plastic sheet is tightly cinched around said pile; and,

after said extending and sliding steps applying an electric current to said heatable strip so as to fuse and seal by



electrical resistance said first end to said second end forming a fused, tightly wrapped pile cover.

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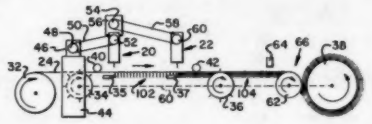
**4,713,130**

## TUFTING PROCESS AND APPARATUS FOR MANUFACTURING WEATHERSTRIPPING

**Robert D. Evans, Weston, Conn., and Robert C. Blezard, Harrissville, R.I., assignors to Amesbury Industries, Inc., Amesbury, Mass.**

**Filed Aug. 14, 1984, Ser. No. 640,667**
**Int. Cl.[4] B32B *5/00***
**U.S. Cl. 156—72** **8 Claims**



1. A method of manufacturing weatherstripping, comprising the steps of:

withdrawing primary backing from a supply of a length thereof and moving the withdrawn primary backing longitudinally and continouously to a location downstream of said supply;

tufting a first row of tufts into said primary backing as it passes a first tufting station between said supply and said location;

tufting second and third rows of tufts into said primary backing as it passes a second tufting station located between said first tufting station and said location;

said second and third rows being tufted into said primary backing immediately adjacent said first row and on each side thereof;

sensing any lateral displacement of said moving primary backing relative to a direction of movement of said primary backing while moving from said supply to the said location; and

adjusting said primary backing laterally with respect to said direction in response to said sensing to locate said first row of tufts centrally between said second and third rows of tufts.

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**4,713,131**

## APPARATUS AND METHOD FOR ULTRASONICALLY JOINING SHEETS OF TERMOPLASTIC MATERIALS

**Edward G. Obeda, Sunset Hill Rd., Brookfield Center, Conn. 06805**

**Filed Jun. 5, 1986, Ser. No. 870,920**
**Int. Cl.[4] B29C *65/06, 65/08***
**U.S. Cl. 156—73.1** **27 Claims**

1. Apparatus for welding sheets of thermoplastic material

together along proximate edges of said sheets to form a welded seam, said apparatus including

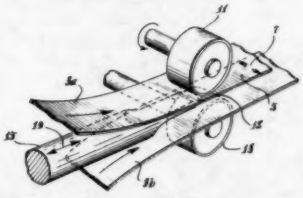
a supporting frame,

a pair of joining rollers mounted on said frame, said rollers having parallel axes and forming a nip therebetween, said nip having an axis parallel to said axes,

driving means to drive at least one of said rollers,

a horn having a tip and means to reciprocate said horn and said tip in the longitudinal axis of said horn, said horn being carried by said frame with said tip in said nip and positioned such that said reciprocation is in a direction transverse to the axis of said nip,

whereby proximate edges of said sheets may move through said nip with one said edge on each side of said tip, be



melted on their surfaces by frictional energy created by said reciprocal motion of said tip, and thereafter be pressed together in said nip.

24. The method of welding together proximate edges of sheets of thermoplastic material including the steps of

continuously moving said proximate edges together so said sheets overlap and form a nip,

melting the inner surfaces of said sheets as they are moved together,

generating frictional heat energy proximate to said nip to cause said melting by rapidly reciprocating a horn tip against said inner surfaces, said reciprocation being in a direction transverse to the axis of said nip, and

pressing said surface together in said nip as said melting sheets cool.

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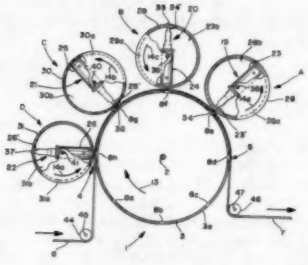
**4,713,132**

## APPARATUS AND METHOD FOR ULTRASONIC BONDING OF A MOVING WEB

**Kent W. Abel, Black Creek, and Gary N. Attoe, Kaukauna, both of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.**

**Filed May 8, 1986, Ser. No. 861,014**
**Int. Cl.⁴ B29C *65/08*; B32B *31/20***
**U.S. Cl. 156—73.1** **17 Claims**



1. Apparatus for ultrasonically bonding a web of bondable material, comprising:

web transport means for moving the web along a web travel path; the web transport means comprising a rotatable drum having an outer cylindrical surface, means for rotating the drum, and means for feeding the web onto the outer cylindrical drum surface at a first position, and for removing the web from the outer cylindrical drum surface at a second position circumferentially spaced-apart from the first position, whereby the segment of the drum surface between the first and second position defines the web travel path;

a plurality of ultrasonic bonding means having respective sonotrode bonding surfaces and disposed along the travel path;

means for energizing the ultrasonic bonding means; and

carrier means for selectively moving the ultrasonic bonding means into intermittent bonding contact with the web during movement of the web along the travel path, the carrier means comprising a plurality of horn rolls, each horn roll having an outer carrier surface at which a respective sonotrode bonding surface is disposed, each outer carrier surface being positionable relative to the surface of the drum so as to bring the sonotrode bonding surface into bonding contact with a web carried on the outer cylindrical drum surface between the first and second positions thereof, and means to rotate the horn rolls to bring the sonotrode bonding surface into the bonding contact position; such that the web is multiply ultrasonically bonded during travel along the travel path by at least one of: (i) successive bonding contacts with a bonding site on the web by different ones of the plurality of ultrasonic bonding means, and (ii) simultaneous bonding contacts with a plurality of diffferent web bonding sites by different ones of the ultrasonic bonding means.

11. A method of ultrasonically bonding a web, comprising:

feeding the web to a first position along a web travel path defined by an outer cylindrical surface of a rotatable drum;

rotating the drum;

providing a plurality of ultrasonic bonding means along the path; the plurality of ultrasonic bonding means comprising a plurality of horn rolls, each horn roll (i) having an outer cylindrical surface comprising a sonotrode bonding surface portion and (ii) being positionable relative to the drum so that the outer cylindrical surface of the horn roll is positioned to engage its associated sonotrode bonding surface portion into bonding contact with a web carried on the outer cylindrical surface of a drum, the horn rolls being concurrently rotated during rotation of the drum;

energizing the ultrasonic bonding means at least when same are in bonding position;

engaging the ultrasonic bonding means with the web in bonding position during movement of the web along the travel path, to multiply ultrasonically bond the web by at least one of the steps of: (i) successively engaging the same bonding site on the web by different ultrasonic bonding means, and (ii) simultaneously engaging different web bonding sites by different ultrasonic bonding means; and

removing the web from the outer cylindrical surface at a second position circumferentially spaced-apart from the first position.

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**4,713,133**

## METHODS OF ADHERING A SELF-FUSING TAPE TO A SUBSTRATE

**Eric G. Kent, Ontario, Canada, assignor to Polysar Limited, Sarnia, Canada**

**Continuation-in-part of Ser. No. 768,110, Aug. 21, 1985, abandoned, and Ser. No. 768,111, Aug. 21, 1985, abandoned, each is a continuation-in-part of Ser. No. 636,719, Aug. 1, 1984, abandoned, which is a continuation-in-part of Ser. No. 465,174, Feb. 9, 1983, abandoned. This application Aug. 6, 1986, Ser. No. 893,809**
**Claims priority, application Canada, Mar. 15, 1982, 398,303**
**Int. Cl.⁴ B32B *31/16, 27/06*; C08L *9/00, 23/04***
**U.S. Cl. 156—162** **17 Claims**

1. The process of affixing to a substrate a flexible layer having insufficient tack to self-bond in the relaxed state, said

layer consisting of a raw polymer mixture selected from the group consisting of (all parts being parts by weight) (a) a mixture of from about 15 to about 30 parts of a polymer of ethylene having a density of from about 0.945 to about 0.965 $gm/cm^3$ with from about 70 to about 85 parts of elastomeric polymer, (b) a mixture of from about 15 to about 30 parts of a linear low density polymer of ethylene having a density of from about 0.91 to about 0.94 $gm/cm^3$ with from about 70 to about 85 parts of elastomeric polymer, and (c) a mixture of from about 15 to about 25 parts of isotactic polypropylene with from about 75 to about 85 parts of elastomeric polymer, said elastomeric polymer consisting of from about 50 to 100 parts by weight of an isobutylene-isoprene polymer and from 0 to about 50 parts by weight of one or more polymers selected from (i) natural rubber, and (ii) homopolymer of isobutylene having a molecular weight from about 50,000 to about 100,000, wherein said flexible layer is subjected to a stretching elongation of at least about 50% immediately prior to contact with the substrate, applying the elongated layer to the substrate in a wrapping operation and allowing overlapping layers of said flexible layer to bond to and fuse with each other.

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**4,713,134**

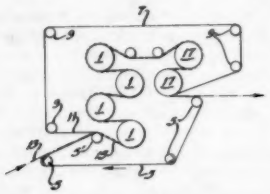
## DOUBLE BELT BONDING OF FIBROUS WEB COMPRISING THERMOPLASTIC FIBERS ON STEAM CANS

**Alfred T. Mays, East Windsor, and Nicholas Wereson, Spotswood, both of N.J., assignors to Chicopee, New Brunswick, N.J.**

**Continuation of Ser. No. 608,253, May 7, 1985, abandoned. This application Aug. 28, 1985, Ser. No. 771,138**

**Int. Cl.[4] D04H** *3/08*

**U.S. Cl. 156—181** **3 Claims**



1. A method of producing a high cross directional strength fused nonwoven fabric comprising thermoplastic fibers, said method comprising:

(a) superimposing a fibrous web comprising at least 5 percent thermoplastic fibers on a first endless carrier belt;

(b) superimposing a second endless carrier belt on said web so as to form a two belt laminate with said web sandwiched between the first and second endless carrier belts;

(c) directing said two belt laminate to travel in a path consecutively around substantial portions of first and second heated rolls, which are offset from each other and spaced apart a sufficient distance to avoid a compression nip between said first and second heated rolls, the peripheral surfaces of said first and second heated rolls cooperating to provide a portion of said path whereby said two belt laminate travels out of contact with said first and second heated rolls, so as to initially apply heat to a first side of said web as said two belt laminate is directed around said first heated roll and thereby fuse the thermoplastic fibers to fibers adjacent the first side thereof and to thereafter apply heat to a second side of said web as said two belt laminate is directed around said second heated roll and thereby fuse the thermoplastic fibers to fibers adjacent the second side thereof; and

(d) cooling the two belt laminate after it has traveled around the first and second heated rolls so as to cool the fibers in the web sandwiched between the first and second endless carrier belts.

2. Apparatus for forming a high cross directional strength nonwoven fabric comprising thermoplastic fibers, said apparatus comprising:

(a) a frame;

(b) first and second heated rolls rotatably mounted to said frame in offset relationship to each other, said rolls being spaced apart a sufficient distance to avoid a compression nip between said first and second rolls;

(c) a first endless carrier belt means mounted to said frame for travel in a path consecutively around substantial portions of said first and second heated rolls;

(d) a second endless carrier belt means mounted to said frame for travel along said path around substantial portions of said first and second heated rolls adjacent to said first belt means;

(e) means for superimposing a fibrous web, comprising at least 5 percent thermoplastic fibers, onto said first belt means so that said first and second belts form a two belt laminate with said web sandwiched therebetween, said two belt laminate being caused to travel in said path consecutively around a substantial portion of said first heated roll to initially apply heat to a first side of said web and thereby fuse the thermoplastic fibers to fibers adjacent the first side thereof and then around a substantial portion of said second heated roll to apply heat to a second side of said web and thereby fuse the thermoplastic fibers to fibers adjacent the second side thereof;

(f) the peripheral surfaces of said first and second heated rolls cooperating to provide a portion of said path whereby said two belt laminate travels out of contact with said first and second heated rolls; and

(g) cooling means for cooling said two belt laminate after it has travelled around said first and second heated rolls to cool the fibers in the web sandwiched between said first and second endless carrier belts.

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**4,713,135**

## PROCESS FOR SEAMING COATED CELLULOSE WEBS

**Douglas J. Bridgeford, Champaign, Ill., assignor to Teepak, Inc., Oak Brook, Ill.**

**Filed Sep. 9, 1985, Ser. No. 774,108**

**Int. Cl.[4] B29C** *53/00*; **C09J** *5/02*

**U.S. Cl. 156—218** **24 Claims**

1. In a process for producing a cellulosic tubular structure suitable for stuffing to form a sausage wherein the longitudinal edges of a web of cellulose containing material are overlapped to form a tube and sealed by applying an aqueous zinc chloride solution between said overlapped edges, the improvement comprising applying at least about 0.002 g of zinc chloride per $cm^2$ of lapped seam between said overlapped edges, sealing said overlapping edges, at a temperature of from about 0° C. to about 125° C., by pressing together said overlapped edges having aqueous zinc chloride solution between and retaining at least 0.002 $g/cm^2$ of zinc chloride at said overlapped seam of said casing.

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**4,713,136**

## METHOD FOR MAKING A SPONGE COLLECTING DEVICE

**Felipe S. Li, Lake Zurich, Ill., assignor to The Kendall Company, Boston, Mass.**

**Continuation of Ser. No. 407,391, Aug. 12, 1982, abandoned, which is a division of Ser. No. 223,187, Jan. 7, 1981, abandoned. This application Aug. 27, 1985, Ser. No. 769,652**

**Int. Cl.[4] B32B** *31/08*, *31/18*

**U.S. Cl. 156—229** **2 Claims**

1. A method of constructing a sponge collecting device, comprising the steps of:

providing a backing sheet of flexible material having a front surface, a rear surface, a pair of side edges, and a pair of end edges;

placing a frong sheet of flexible material over the front surface of the backing sheet;

bonding the front sheet to the backing sheet along a plurality of laterial lines extending substantially between the side edges of the backing sheet and spaced along the length of the sheets;

severing the front sheet along spaced upper and lower lateral lines on opposed sides of the lateral bonding lines while increasing the length of the front sheet at a location intermediate the bonding lines and the lower severance lines by moving the front sheet away from the backing

sheet prior to severing by inserting an elongated member between the front sheet and backing sheet such that the portions of the front sheet intermediate the bonding lines and the lower severance lines have a sufficient length to overlap the portions of the front sheet intermediate the bonding lines and the upper severance lines; and

bonding side portions of the front sheet to the backing sheet along longitudinal lines extending from the lateral bonding lines to the upper severance lines adjacent the side edges of the backing sheet.

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**4,713,137**

## RESIN COMPOSITION AND A PROCESS FOR PREPARING LAMINATES THEREFROM

**Diane Sexton, Lauf, Fed. Rep. of Germany, assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Jul. 30, 1986, Ser. No. 892,022**

**Claims priority, application United Kingdom, Jul. 31, 1985, 8519290**

**Int. Cl.⁴ B05D *5/12***

**U.S. Cl. 156—233** **8 Claims**

1. A process for preparing electrical laminates which comprises the steps of (a) impregnating a resinforcing web with an epoxy resin composition containing an epoxy resin possessing more than one 1,2-epoxy group, a hardener for the epoxy resin and an organic solvent; (b) heating the thus prepared prepreg at a temperature sufficient to cure the epoxy resin and (c) subsequently fabricating the prepreg into an electrical laminate by laminating onr or more layers of the prepreg with electrical conductive material and heating the thus prepared laminate at elevated temperature and pressure; wherein the hardener is a polyhydric phenolic hardener and the epoxy resin composition contains an acid having a pKa at 25° C. of less than 2.5 or an ester or anhydride of such acid.

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**4,713,138**

## METHOD OF PRODUCING ABRASION-RESISTANT DECORATIVE LAMINATE

**Israel S. Ungar, Randallstown; Nelson L. O'Neill, Crofton; Herbert I. Scher, Randallstown, and Robin D. O'Dell, Pasadena, all of Md., assignors to Nevamar Corporation, Odenton, Md.**

**Filed Dec. 26, 1984, Ser. No. 686,350**

**Int. Cl.⁴ C09J *5/02***

**U.S. Cl. 156—307.4** **19 Claims**

1. A method of providing a paper facing sheet for use as the uppermost sheet in the manufacture of an abrasion-resistant decorative laminate, the method consisting essentially of

preparing in mixture of a liquid thermosettable impregnating resin and an abrasion-resistant composition, said mixture during subsequent coating and impregnation having a viscosity no greater than about 200 centipoise, said abrasion-resistant composition comprising a mixture of (1) an abrasion-resistant hard mineral of fine particle size in quantity sufficient to provide an abrasion-resistant layer without interfering with visibility and (2) binder material for said mineral which binder material has the properties of withstanding the subsequent laminating conditions and being compatible with said thermosetting resin, said binder being present in an amount sufficient to bind said abrasion-resistant mineral to the surface of an unsaturated paper sheet, and said binder material suspending said abrasion-resistant hard mineral particles in said liquid thermosettable impregnating resin;

effecting coating and impregnating in essentially one step by coating said mixture of said liquid thermosettable impregnating resin and said abrasion-resistant composition over the facing surface of said unsaturated paper sheet at a rate such that said paper sheet becomes substantially saturated with said liquid resin, and said abrasion-resistant composition becomes deposited on said facing surface in an ultrathin layer, said mixture having a viscosity no greater than about 200 centipoise during saturation of said paper sheet; and

drying said coated and impregnated paper sheet at an elevated temperature and thereby obtaining a paper facing sheet for use as the uppermost sheet in the manufacture of a decorative laminate.

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**4,713,139**

## APPARATUS FOR PRODUCING FLEXIBLE COMPOSITE MATERIAL

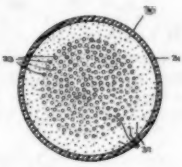
**Roland A. Ganga, Joinville Le Pont, France, assignor to Atochem, France**

**Division of Ser. No. 624,044, Jun. 25, 1984, Pat. No. 4,614,678. This application Dec. 19, 1986, Ser. No. 911,002**

**Claims priority, application France, Jun. 28, 1983, 83 10632; Apr. 10, 1984, 84 05627**

**Int. Cl.⁴ B29C *47/02***

**U.S. Cl. 156—500** **5 Claims**



1. Apparatus for preparing a composite article comprising a flexible sheath covering a roving of fibers impregnated with thermoplastic powder melting at or above the melting point of the flexible sheathing material, which apparatus comprises means for holding and supplying roving continuously; a holding tank capable of fluidizing the thermoplastic powder, and wherein the thermoplastic powder is introduced onto and into the peripheral surface of the roving to coat the individual fibers of the roving with the powder, the holding tank having a first lock capable of receiving roving from the holding and supply means and of keeping gas from escaping from the holding tank, and the holding tank having a second lock capable of receiving roving from the inside of the holding tank and permitting the roving to pass out of the holding tank and capable of preventing gas from escaping from the holding tank; a die positioned after the second lock, the die being capable of receiving roving from the lock; an extruder feeding plastic material to one die and the die covering the roving with the plastic material to form sheathing around the roving; and a take-up means capable of continuously receiving the sheathed roving.

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**4,713,140**

## LASER LUMINESCENCE MONITOR FOR MATERIAL THICKNESS

**Zu-Jean Tien, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 2, 1987, Ser. No. 20,402**

**Int. Cl.⁴ H01L *21/306*; B44C *1/22*; B05D *3/06*; B05C *11/00***

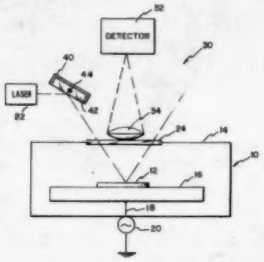
**U.S. Cl. 156—626** **39 Claims**

25. A method for monitoring a change in thickness of a first material layer with a first bandgap energy, said first material layer for disposal over a second material layer formed on a

wafer, with said second material layer having a different bandgap energy, wherein at least one of said material bandgaps is a direct bandgap, comprising the steps of:

changing the thickness of said first material layer having said first bandgap energy at a particular location over said second material layer;

generating a beam of energy of an intensity and wavelength sufficient to pump said at least one direct bandgap material layer to a higher energy state;




directing said beam of energy to impinge at an angle on to the surface and to penetrate said wafer at said location where said first material thickness is being changed; and

detecting induced luminescence from said at least one direct bandgap material layer to determine when to alter said thickness changing step.

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**4,713,141**

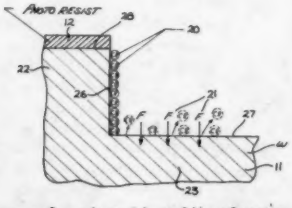
**ANISOTROPIC PLASMA ETCHING OF TUNGSTEN**

**Chi-Hwa Tsang, Beaverton, Oreg., assignor to Intel Corporation, Santa Clara, Calif.**

**Filed Sep. 22, 1986, Ser. No. 910,078**

**Int. Cl.[4] C23F *1/02*; B44C *1/22*; C03C *15/00, 25/06***

**U.S. Cl. 156—643** **16 Claims**




1. A process for anisotropic etching of tungsten, comprising the steps of:

forming a plasma gas mixture having fluorinated and chlorinated gases;

subjecting said tungsten to said plasma gas mixture;

said chlorinated gases forming along side walls developed during said etching process and preventing etching of said side walls;

whereby anisotropic etch of said tungsten is achieved.

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**4,713,142**

**METHOD FOR FABRICATING EPROM ARRAY**

**Allan T. Mitchell, Garland, and James L. Paterson, Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Division of Ser. No. 729,439, May 1, 1985, Pat. No. 4,597,060. This application Apr. 4, 1986, Ser. No. 848,411**

**Int. Cl.[4] H01L *21/306*; B44C *1/22*; C03C *15/00*; C23F *1/02***

**U.S. Cl. 156—653** **7 Claims**

1. A process for forming a nonvolatile memory comprising the steps of:

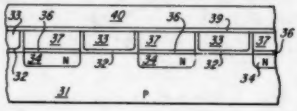
providing a semiconductor substrate;

forming conductive strips on the surface of but insulated from said substrate;

forming source/drain regions in said substrate between said conductive strips;

depositing a conformal layer of insulating material on the surface of said substrate and said conductive strips;

planarizing said layer of insulating material to a point where the top surface of said layer of insulating material is substantially even with the top surface of said conductive strips;




forming a layer of conductive material on the surface of said conformal layer and on the surface of but insulated from said conductive strips; and

etching said layer of conductive material and said conductive strips to form word lines from said layer of conductive material running perpendicular to said conductive strips and to form floating gates from said conductive strips disposed beneath said word lines.

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**4,713,143**

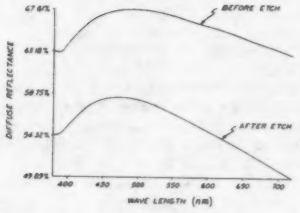
**ETCHING OF VACUUM METALLIZED INDIUM**

**Richard C. Eisfeller, Greenland, N.H., assignor to Davidson Textron Inc., Dover, N.H.**

**Filed Apr. 16, 1987, Ser. No. 39,064**

**Int. Cl.[4] B44C *1/22*; C03C *15/00, 25/06*; C23F *1/02***

**U.S. Cl. 156—655** **16 Claims**




1. In a process of manufacturing a corrosion resistant vacuum metallized article in which a dielectric substrate surface has vacuum deposition thereon of a corrosive metal and wherein vacuum deposition of the metal continues only until there is formation of discrete islands of said metal which visually appear as a continuous film while having channels between discrete islands to maintain electrically non-conductive the film over the substrate, the improvement comprising: etching the vacuum deposited material with a solvent which dissolves residuals of metal from the channels to clear the channels so as to expose clean bonding surfaces on the substrate at the base of the channels and applying a clear resinous protective dielectric top coat to both the surfaces of the discrete islands and to the clean bonding surfaces and drying the top coat to form a protective film encapsulating said discrete islands and bonded to the substrate at the base of the channels by a bond force throughout the surface extent of the channel base greater than two orders of magnitude in strength as compared to the bond force between the top coat and the discrete islands.

4,713,144

## COMPOSITION AND METHOD FOR STRIPPING FILMS FROM PRINTED CIRCUIT BOARDS

Harold Schiller, Long Beach, Calif., assignor to Ardrox Inc., La Mirada, Calif.

Filed Aug. 1, 1986, Ser. No. 893,027
Int. Cl.[4] C23F *1/02*; B44C *1/22*; C03C *15/00, 25/06*
U.S. Cl. 156—656 11 Claims

5. In a method of rapidly stripping solder and the underlying tin-copper alloy from the copper substrate of a printed circuit board, the steps of:

providing an aqueous solution consisting essentially of about 5 to 50 volume percent of 69% nitric acid aqueous solution, about 1 to 50 volume percent of 45% ferric nitrate aqueous solution, about 5 grams per liter to saturation of sulfamic acid, and the balance water; and

applying the solution to the printed circuit board.

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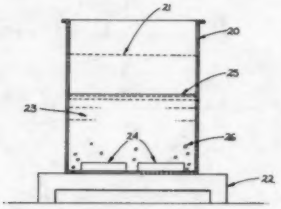
4,713,145

## METHOD OF ETCHING ETCH-RESISTANT MATERIALS

Vikram N. Doshi, Costa Mesa, Calif., assignor to Gulton Industries, Inc., Costa Mesa, Calif.

Filed Dec. 19, 1986, Ser. No. 943,683
Int. Cl.[4] B44C *1/22*; C23F *1/00*
U.S. Cl. 156—667 8 Claims




1. A method for etching the surface of an item, comprising the steps of:

placing a quantity of phosphoric acid solution in a vessel;

heating the vessel for a period of time until the liquid phosphoric acid solution jells and a white precipitate forms, resulting in a gel-like precipitated form of phosphoric acid;

submerging the item in the gel-like precipitated form of phosphoric acid;

maintaining the gel-like precipitated form of phosphoric acid at an elevated temperature; and

removing the item from the gel-like precipitated form of the phosphoric acid after a period of time, the length of which period of time depends on the amount of etching that is desired.

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4,713,146

## DRIVE SHAFT ASSEMBLY

Matthew C. Ek, Chico, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 14, 1985, Ser. No. 691,087
Int. Cl.[4] B01D *1/18*
U.S. Cl. 159—4.2 22 Claims

1. In a machine including a drive means for imparting torque at a high rotational speed to a drive assembly for transmitting siad torque to a work piece which is subjected to variable imbalance conditions during normal operation of the machine, the improvement in the drive shaft assembly to accommodate such imbalance conditions comprising:

an elongated inner dirve shaft having opposite ends, one of said ends being provided with engagement means engaged with said drive means for receiving the torque therefrom and the opposite end being cooperatively engaged with said work piece for transmitting the torque thereto;

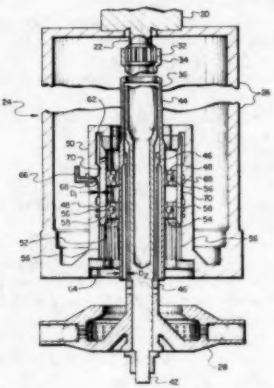
a substantially cylindrical, hollow, outer shaft circumferentially surrounding said drive shaft and coaxial therewith, said outer shaft having an inner surface spaced apart from an outer surface of said drive shaft and said outer shaft being connected to said drive shaft;

first spring means for resiliently inhibiting movement of said outer shaft out of its coaxial position with said drive shaft;

a bearing carrier member circumferentially surrounding and extending coaxially with said outer shaft;

bearing means located circumferentially about an outer surface of said outer shaft for permitting rotational movement of said outer shaft, said bearing means being retained in position by an inner surface of said bearing carrier member and the outer surface of said outer shaft;

lubrication means for providing a flow of lubricant to said bearing means;



second spring means for resiliently inhibiting movement of said bearing carrier member from its coaxial position with said outer shaft;

a support structure supporting said drive menas, said support structure including a bore defined by an inner surface circumferentially surrounding said barrier carrier member and second spring means, the bore extending substantially coaxially with both of said shafts and said bearing carrier member, the outer surface of said bearing carrier member and inner surface of the bore cooperatively forming an annular fluid flow passageway, said annular fluid flow passageway being bounded on either side annular, axially extending barriers, each barrier forming a restricted fluid flow path; and

means for providing a pressurized flow of a viscous fluid to said annular fluid flow passageway during normal operation of the machine such that said fluid will flow axially across each barrier forming a squeeze film damper to resist lateral movement of said bearing carrier member.

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4,713,147

## EXTENDED NIP PRESS WITH DISPLACEABLE CENTER OF GRAVITY FOR THE SUPPORTING FORCE

Esko Saarinen, Tampere, Finland, assignor to Oy Tampella AB, Tampere, Finland

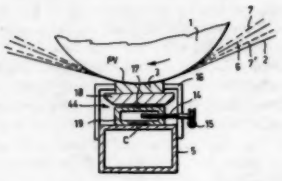
Filed Apr. 29, 1983, Ser. No. 489,830
Claims priority, application Finland, May 5, 1982, 821584
Int. Cl.[4] D21F *3/06*
U.S. Cl. 162—358 14 Claims

1. An extended nip press for a paper machine for removing water from a wet paper, cardboard or similar fibrous or porous web, said press comprising

a rotating press roll,

at least one stationary loading shoe parallel to the axis of said press roll and pivotable around an axis parallel to said axis, said loading shoe together with said press roll forming an extended press zone,

at least one dewatering felt passing between said press roll and a band for passing the web to be dewatered through said press zone, and



a support means located between said loading shoe and its supporting frame for applying a supporting force on said loading shoe, said supporting force pressing said loading shoe against said press roll, said support means being provided with transfer elements for displacing the centre of gravity of the supporting force acting on said loading shoe in the direction of movement of the web to be dewatered.

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**4,713,148**

## LIGHT CONSTRUCTION PLUG FOR COKE OVEN DOORS

**Ludwig Offermann, Olfen, Fed. Rep. of Germany, assignor to Firma Carl Still GmbH & Co. KG, Fed. Rep. of Germany**

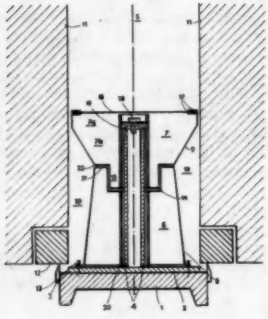
**PCT No. PCT/EP85/00096, § 371 Date Nov. 12, 1985, § 102(e) Date Nov. 12, 1985, PCT Pub. No. WO85/04180, PCT Pub. Date Sep. 26, 1985**

**PCT Filed Mar. 12, 1985, Ser. No. 801,151**

**Claims priority, application Fed. Rep. of Germany, Mar. 14, 1984, 34092242**

**Int. Cl.[4] C10B *25/06***

**U.S. Cl. 202—248** **15 Claims**



1. A coke oven door in combination with a coke oven having a coke oven chamber and spaced apart wall portions defining a chamber opening therebetween; said coke oven door comprising a door body for engaging over the chamber opening to close the opening; at least a first and a second box-like metallic hollow body connected to and supported by said door body and closely engaged with each other, said first hollow body being adjacent to said door body and said second hollow body being spaced away from said door body so that said at least first and second hollow body extend serially into the chamber between the wall portions to form a plug extending inwardly of the chamber with said door body engaged over the chamber opening with the hollow bodies and said door body are in a closed position; said first hollow body including a pair of laterally spaced outside walls and said second hollow body including a pair of laterally spaced outside walls, said outside walls of said first hollow body cooperating with said outside walls of said second hollow body and said chamber spaced apart wall portions to define laterally spaced concave and vertically extending gas pressure equalizing channels; said at least first and second hollow body being detachable from each other and detachably connected to said door body to allow for replacement whereby a horizontal cross-sectional shape of said pressure equalizing channels can be changed.

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**4,713,149**

## METHOD AND APPARATUS FOR ELECTROPLATING OBJECTS

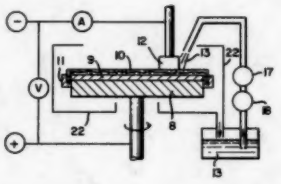
**Shigeo Hoshino, 1244-7, Mukogaoka, Miyamai-Ku, Kawasaki-shi, Kanagawa-ken 213, Japan**

**Filed Nov. 21, 1986, Ser. No. 933,167**

**Claims priority, application Japan, Nov. 26, 1985, 60-263888**

**Int. Cl.[4] C25D *5/22, 17/00***

**U.S. Cl. 204—23** **13 Claims**



1. An apparatus for electroplating objects comprising an anode, an object to be plated serving as a cathode, said anode comprising a carbon fiber material and said anode placed adjacent said object, means for supplying a plating solution to the interface of said object and said anode through the carbon fiber material of said anode, means for supplying an electric current between said anode and said cathode; and means for providing relative motion between said anode and said object so that during the plating operation movement between the object to be plated and the carbon fiber material of the anode can be maintained.

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**4,713,150**

## PROCESS FOR PREPARING A PART FOR COLOR ANODIZATION

**Lloyd Hornbostel, Beloit, and Dale Butrymowicz, Janesville, both of Wis., assignors to Parker Pen Ltd., East Sussex, England**

**Filed Nov. 8, 1985, Ser. No. 796,195**

**Int. Cl.[4] C23C *28/00***

**U.S. Cl. 204—38.3** **5 Claims**

1. A method of forming an ornamental coating on an article of manufacture comprising the steps of:

providing a substrate having a metallic surface consisting of the metal brass;

plating said surface with a first layer of nickel to a thickness of between two to five microns;

sputter-depositing over said first layer a second layer of niobium to a thickness of between one to five microns;

cleaning said second layer; and

color anodizing said second layer in a solution of ammonium sulphate and water.

4,713,151

## ELECTRODEPOSITION OF LITHIUM

David J. Smith, Kingston, Canada, assignor to Amoco Corporation, Chicago, Ill.

Filed Oct. 31, 1986, Ser. No. 925,327
Int. Cl.[4] C25D *3/54;* H01M *6/14, 6/16*
U.S. Cl. 204—58.5 20 Claims

17. A process for electrodepositing lithium comprising electrolyzing a nonaqueous solution which comprises at least one lithium salt and a minor amount of at least one triglyceride dissolved in liquid sulfur dioxide, wherein at least one of the three fatty acid residues of said triglyceride is that of ricinoleic acid.

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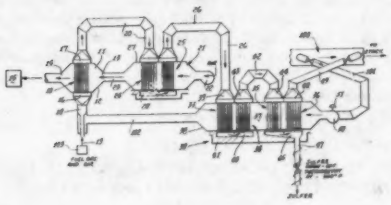
4,713,152

## METHOD AND SYSTEM FOR THE REMOVAL OF OXIDES OF NITROGEN AND SULFUR FROM COMBUSTION PROCESSES

John V. Walsh, Glendora, Calif., assignor to VSM Associates, Inc., Covina, Calif.

Filed Mar. 9, 1987, Ser. No. 23,724
Int. Cl.[4] C25F *5/00*
U.S. Cl. 204—130 26 Claims



1. In a process for removing oxide contaminants from combustion gas, and employing solid electrolyte reactor means, the steps that include:

(a) flowing the combustion gas into a zone containing said solid electrolyte means and applying a voltage to said means and at elevated temperature to thereby separate oxygen via said solid electrolyte means,

(b) removing oxygen from said zone in a first stream and removing hot effluent gas from said zone in a second stream, the effluent gas containing contaminant,

(c) and pre-heating the combustion gas flowing to said zone by passing it in heat exchange relation with said hot effluent gas.

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4,713,153

## PROCESS AND APPARATUS FOR CLEANING BY ELECTROCHEMICAL PICKLING WITH ALTERNATING CURRENT OF SPECIFIED FREQUENCY

Ludo Adriaensen, Deerlijk, and Bernard Decouttere, Beveren Leie, both of Belgium, assignors to N. V. Bekaert S. A., Zwevegem, Belgium

Filed Jun. 20, 1986, Ser. No. 876,498
Claims priority, application United Kingdom, Jul. 12, 1985, 8517606
Int. Cl.[4] C25F *1/06*
U.S. Cl. 204—144.5 13 Claims

1. A process for cleaning a carbon steel strand with more than 0.30% C by means of an electrochemical pickling method comprising:

passing the strand to be cleaned through an electrolytic pickling bath comprising an aqueous solution of hydrochloric acid, and subjecting the strand therein to the action of an alternating current having a density of at least 25 A/dm$^2$ and a frequency of at least 200 Hertz, thereby producing a substantially bare strand.

4,713,154

## CONTINUOUS ANNEALING AND PICKLING METHOD AND APPARATUS FOR STEEL STRIPS

Norio Ohta; Fumiya Yanagishima; Toshikazu Kaihara; Akira Kishida; Kuniaki Sato, and Masanobu Ochiai, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

Filed Aug. 5, 1986, Ser. No. 893,476
Claims priority, application Japan, Aug. 8, 1985, 60-173134; Jun. 27, 1986, 61-149782
Int. Cl.[4] C25F *1/06, 7/00*
U.S. Cl. 204—145 R 8 Claims

1. A method of continuously annealing and pickling cold rolled stainless steel strips successively transferred through a continuous annealing apparatus including heating and cooling zones and a pickling apparatus, wherein annealing the strips is effected in reducing atmosphere consisting of hydrogen within a range of 3–15% and nitrogen of substantially the remainder and thereafter pickling is effected at least by nitric acid electrolyte treatment.

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4,713,155

## METHOD FOR PREPARATION OF PHOSPHATIDE CONCENTRATES FROM VEGETABLE OILS

Norair S. Arutjunian; Elena P. Kornena; Robert V. Kazarian; Natalya A. Ponomareva; Grigory V. Redko; Lidia T. Sakhno, and Irina S. Zhidkova, all of Krasnodar, U.S.S.R., assignors to Krasnodarsky Politekhnichesky Institut, Krasnodar, U.S.S.R.

Filed Jul. 10, 1986, Ser. No. 884,038
Int. Cl.[4] C25F *1/00*
U.S. Cl. 204—155 9 Claims

1. A method for preparation of phosphatide concentrates from vegetable oils comprising treating crude vegetable oil with a hydrating agent selected from the group consisting of water and aqueous solutions of electrolytes, separating phospholipids from hydrated vegetable oil providing a phospholipid sediment, passing said sediment through an electromagnetic field with a strength of 40 000–24 000 Amperes/meter at 5°–65° C., and drying the treated phospholipid sediment.

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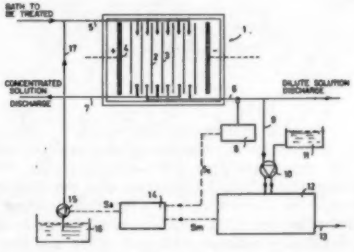
4,713,156

## PROCESS FOR REGULATING AN ELECTRO-DIALYZER AND IMPROVED ELECTRODIALYSIS APPARATUS

Jean-Yves Gal, 75 impasse du Dragon, Le Clos Saint Georges, 34000 Montpellier; Jean-Michel Chiapello, 4 rue Castel Moton, 34000 Montpellier; Martial Peyrot, 87 avenue de la Révolution, and Etienné Tourneux, 87 rue Pierre Brossolette, both of 87000 Limoges, all of France

Filed Jan. 2, 1987, Ser. No. 283
Claims priority, application France, Jan. 2, 1986, 86 00072
Int. Cl.[4] B01D *13/02;* C02F *1/46*
U.S. Cl. 204—182.4 12 Claims




1. A process for regulating the electrodialysis of a cyanide metal bath having a stack of ion exchange membranes in an electric field, an intake for the cyanide bath to be treated, a discharge for the concentrated solution and a discharge for the dilute solution, the process comprising measuring the content of free cyanide in the dilute solution at said discharge and

adding to the cyanide bath at said intake a solution of cyanide containing free cyanide ions as an inverse function of the measured content.

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**4,713,157**

## COMBINED INTEGRATED CIRCUIT/FERROELECTRIC MEMORY DEVICE, AND ION BEAM METHODS OF CONSTRUCTING SAME

**Larry McMillan; Carlos Paz de Araujo, both of Colorado Springs, Colo., and George A. Rohrer, Chassell, Mich., assignors to Ramtron Corporation, Colorado Springs, Colo.**

**Continuation-in-part of Ser. No. 695,969, Jan. 29, 1985, which is a continuation-in-part of Ser. No. 133,338, Mar. 24, 1980, which is a continuation-in-part of Ser. No. 658,199, Feb. 17, 1976, Pat. No. 4,195,355, which is a continuation-in-part of Ser. No. 316,417, Dec. 18, 1972, Pat. No. 3,939,292, which is a continuation-in-part of Ser. No. 076,059, Sep. 28, 1970, Pat. No. 3,728,694. This application May 14, 1985, Ser. No. 733,939**

**Int. Cl.[4] C23C *14/00***

**U.S. Cl. 204—192.11** **13 Claims**

1. A method of depositing a ferroelectric material by ion beam techniques, comprising:

(a) mounting a target bed of a ferroelectric material in an ion beam machine;

(b) mounting a substrate a predetermined distance from said target bed within said ion beam machine;

(c) evacuating said ion beam machine to a predetermined vacuum level;

(d) directing a beam of high energy particles at said target bed whereby molecular sized amounts of said ferroelectric material are ejected from said target bed and subsequently deposited on said substrate;

(e) said ferroelectric material being selected from the group consisting of metal nitrates, metal nitrites, metal phosphates, and sulfates;

(f) said target bet comprising a support member having an amount of ferroelectric materials substantially tightly adhered to one surface thereof; and

(g) said supporting member being substantially planar and having a recess formed in one surface thereof for containing said ferroelectric material.

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**4,713,158**

## SYSTEM FOR APPLIED CURRENT CATHODIC PROTECTION OF A STRUCTURE

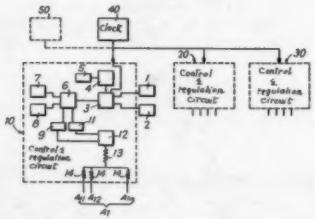
**Maurice Lambert, Lardy, France, assignor to Service National: Gaz de France, Paris, France**

**Filed Jul. 21, 1986, Ser. No. 887,214**

**Claims priority, application France, Jul. 23, 1985, 85 11259**

**Int. Cl.[4] C23F *13/00***

**U.S. Cl. 204—196** **8 Claims**




1. An applied current cathodic protection system for a structure placed in an electrolyte, the system comprising:

a cathode constituted by the structure to be protected;

a group of anodes isolated from the structure and in contact with the electrolyte in which said structure is placed;

a DC generator connected between the cathode-forming structure and said group of anodes in contact with the electrolyte;

a reference electrode

a control and regulation circuit, connected to said reference electrode and said generator, for adjusting the potential delivered by said generator and consequently for adjusting the current applied to said anodes;

means for bringing into service in a cyclic manner the circuit for controlling and regulating said generator;

means for reading the potential provided by the reference electrode and for calculating the potential difference between the protected structure and the electrode potential as read;

comparator means for comparing the calculated potential difference with a first reference potential constituting an upper threshold and with a second reference potential constituting a lower threshold; and

means for adjusting the absolute value of output voltage delivered by the generator in a single step during each cycle of the cyclic operation of said circuit for controlling and regulating the generator, said means increasing said absolute value by a fixed predetermined value different from zero if the calculated potential difference is less negative than the upper threshold, decreasing said absolute value by a fixed predetermined value different from zero if the calculated potential difference is more negative than the lower threshold and adding to said absolute value a predetermined value equal to zero if the calculated potential difference is between the lower and upper thresholds.

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**4,713,159**

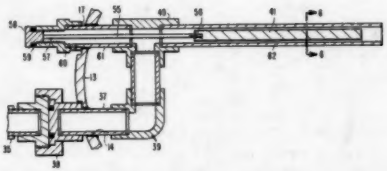
## COMPACT AND CLEANABLE APPARATUS FOR PREVENTING SCALE FORMATION IN LIQUID SYSTEMS

**Robert B. Truitt, West Lafayette, and V. Bruce Junius, Lafayette, both of Ind., assignors to Fluid Mechanics, Lafayette, Ind.**

**Filed May 7, 1986, Ser. No. 860,746**

**Int. Cl.[4] C23F *13/00***

**U.S. Cl. 204—197** **5 Claims**



1. Apparatus for stabilizing water comprising:

a container for holding water and having an inlet for receiving untreated water and an outlet through which treated water may flow from said container:

inlet pipe means mounted to said inlet and extending into said container with said inlet pipe means having a bottom end;

outlet pipe means mounted to said outlet;

sleeve means mounted to and sealingly extending out of said container at a location separate from said inlet pipe means and said outlet pipe means, said sleeve means having a removable external cap; and,

treatment means suspendedly mounted in said container having a conduit connected to said bottom end of said inlet pipe means to receive said untreated water therefrom and further including a metal treatment member removable through said sleeve means once said cap is removed, said conduit circumferentially surrounding said metal treatment member with said member having surfaces exposed to said untreated water passing through said conduit, and wherein;

said conduit is suspendedly mounted within said container and is in liquid communication with said inlet pipe means to receive all of said untreated water therefrom, said metal member is located within said conduit and has a plurality of longitudinally extending edges in contact with said conduit forming a plurality of separate passages between said metal member and said conduit extending the length of said metal member and through which said untreated water passes contacting said metal member prior to exiting said conduit into said container, all of said untreated water being adapted to contact said metal member and flow in one direction along the entire length thereof prior to release into said container.

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**4,713,160**

## CURRENT LEAKAGE APPARATUS IN ELECTROLYTIC CELL

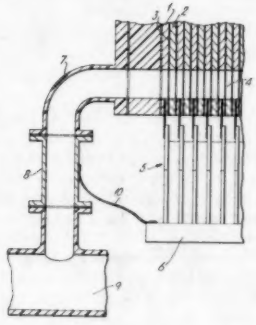
**Peter J. Moreland, Frodsham, England, assignor to Imperial Chemical Industries PLC, London, England**

**Filed Dec. 13, 1985, Ser. No. 808,561**

**Claims priority, application United Kingdom, Dec. 28, 1984, 8432704**

**Int. Cl.[4] C25B** *15/08, 9/04*

**U.S. Cl. 204—231** **2 Claims**



1. An electrolytic cell comprising at least one anode and at least one cathode and a separator positioned between each anode and adjacent cathode to form in the cell separate anode compartments and cathode compartments, and pipework for charging liquor to and/or for removing liquor from said anode compartments and pipework for charging liquor to and/or removing liquor from said cathode compartments, in which at least one of said pipeworks is made in part of an electrically non-conducting material and which also comprises an electrically conducting electrode material positioned in said pipework, and in which said electrode material is positioned in the pipework for charging liquor to and/for removing liquor from said anode compartments and is connected directly or indirectly to said anode by means of an electrical connection external of the electrolytic cell.

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**4,713,161**

## DEVICE FOR CONNECTION BETWEEN VERY HIGH INTENSITY ELECTROLYSIS CELLS FOR THE PRODUCTION OF ALUMINIUM COMPRISING A SUPPLY CIRCUIT AND AN INDEPENDENT CIRCUIT FOR CORRECTING THE MAGNETIC FIELD

**Joseph Chaffy; Bernard Langon, and Michel Leroy, all of St. Jean de Maurienne, France, assignors to Aluminium Pechiney, Paris, France**

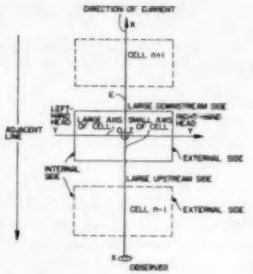
**Filed Jun. 5, 1986, Ser. No. 870,919**

**Claims priority, application France, Jun. 5, 1985, 85 08924**

**Int. Cl.[4] C25C** *3/16*

**U.S. Cl. 204—243 M** **14 Claims**

1. In a circuit for electrical connection between two successive cells of rank n and rank n+1 in a series of cells for the production of aluminum by electrolysis of alumina dissolved in molten cryolite by the Hall-Heroult process at a total electrolysis current J1 of an intensity of at least 150 kA, and possibly attaining 500 to 600 kA, each cell being constituted by an insulated parallelepiped metal container of which the large axis is perpendicular to the axis of the series and of which the two tank ends comprise respectively, a left-hand head and a right-hand head, the container supporting a cathode formed by the juxtaposition of carbonaceous blocks in which there are sealed metal rods of which the rod ends issue from the container, generally on its two large upstream and downstream sides, relative to the direction of the current in the series, each cell also comprising an anode system formed by at least one horizontal rigid beam supporting at least one horizontal conducting rod comprising an anode frame on which anode suspension shafts are attached, the connecting circuit comprising, a circuit




for the transmission of electrolysis current between two successive cells constituted by cathode collectors connected to the cathode outputs of the cell in rank n and to the connecting conductors which join, via risers, the anode frame on the cell of rank n+1 in the series, the improvement comprising, in addition to the circuit for the transmission of electrolysis current, a distinct circuit comprising means for the correction and balancing of the magnetic fields and which comprises a first conductor which is substantially parallel to the axis of the series and adjacent to said left-hand heads, and a second conductor which is substantially parallel to the axis of the series and adjacent to said right-hand heads, said first and second conductors being adapted to be traversed by a direct current J2 in the same direction as the electrolysis current and which creates in the cells a vertical correcting magnetic field which is directed downwards close to the left-hand heads and is directed upwards close to the right-hand heads.

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**4,713,162**

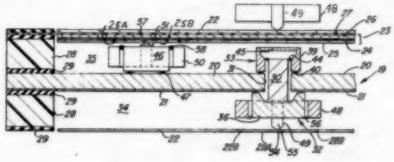
## BIPOLAR ELECTROLYTIC CELL

**John R. Pimlott, Sweeny, Tex., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Aug. 29, 1986, Ser. No. 901,845**

**Int. Cl.[4] C25C** *3/08*

**U.S. Cl. 204—254** **20 Claims**



1. A bipolar electrolytic cell comprising a centerboard having opposite anode and cathode surfaces confronting and

spaced from an anode and a cathode respectively, an electrically conductive rod extending transversely through said centerboard, first and second protective cover means electrically connected with said rod and cooperable with said centerboard for completely shielding said rod and its electrical connections from fluid in said cell, said first cover means comprising an electrically conductive cup having its opening overlying one end of said rod and having an annular rim portion around the mouth of said opening welded to one of said surfaces of said centerboard entirely around said rod, said rod and the interior of said cup having coextensive shaped surface portions joined by a direct surface-to-surface weld therebetween throughout their coextensive surfaces.

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**4,713,163**

## POROUS DIAPHRAGM FOR ELECTROLYTIC CELL

**John F. Cairns, and Gawin W. Cowell, both of Cheshire, England, assignors to Imperial Chemical Industries PLC, London, England**

**Filed Jun. 6, 1983, Ser. No. 501,764**

**Claims priority, application United Kingdom, Jun. 9, 1982, 8216747**

**Int. Cl.[4] C25B *1/16***

**U.S. Cl. 204—296** **17 Claims**

1. A porous sheet diaphragm of an organic polymeric material said sheet containing throughout the thickness of the sheet at least one wetting agent which is a substance capable of increasing the time for which the sheet remains permeable to an aqueous solution of an electrolyte, characterised in that the concentration of the said substance in that part of the sheet near to one or to both outer surfaces of the sheet is greater than the concentration of the said substance in that part of the sheet remote from the outer surfaces of the sheet.

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**4,713,164**

## APPARATUS FOR ANALYZING MALODORS IN THE BREATH

**Rickie F. Krietemeier, Englewood, and Laurence W. Ross, Denver, both of Colo., assignors to Confidence Corporation, Englewood, Colo.**

**Filed Jul. 25, 1985, Ser. No. 758,826**

**Int. Cl.[4] G01N *27/46***

**U.S. Cl. 204—400** **13 Claims**

1. A sensor for the detection of contaminants in streams of gases by electrochemical methods, the combination comprising:

means defining a normally sealed, hand-held housing including inner and outer casings movable between an open position and a closed position;

detection means operably disposed within said housing, said detection means comprising at least two electrodes and electrolyte means, said electrodes in communication with said electrolyte means, said electrolyte means operable to create an electric potential between said electrodes upon detection of contaminants in a sample gas stream;

first valve means for selectively directing a sample gas stream to one of said electrodes with said housing in the open position;

second valve means for selectively directing a reference gas steam to another electrode with said housing in the open position; and

means for producing an electic signal upon detection of contaminants by said detection means.

**4,713,165**

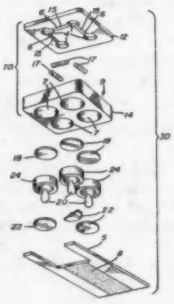
## SENSOR HAVING ION-SELECTIVE ELECTRODES

**Gilbert Conover, Providence, R.I.; Thaddeus Minior, Lawrence, and John P. Willis, Harvard, both of Mass., assignors to Ilex Corporation, Boston, Mass.**

**Filed Jul. 2, 1986, Ser. No. 881,099**

**Int. Cl.[4] G01N *27/30***

**U.S. Cl. 204—403** **14 Claims**



1. A sensor for the potentiometric determination of the activity of an ion or other concentration of a component in a sample, the ion being selected from the group consisting of hydrogen ions, potassium ions, sodium ions, chloride ions, ammonium ions, carbonate ions, bicarbonate ions, and calcium ions, the sensor comprising:

a. a frame having an upper section and a lower section, each section having at least two openings therethrough and grooves in the mating surfaces thereof between the openings, the upper section and the lower section mating in such a relationship that the holes in the two sections are aligned and the grooves in the mating surfaces are aligned to form internal channels between the openings;

b. ion selective electrodes in the openings, each electrode being comprised of:

1. an ion selective membrane which is comprised of an ionophore selective for the ion whose activity is to be determined; a thermoplastic resin or a plastic; and a plasticizer;

2. a reference electrode; and

3. an internal reference material having a known concentration of the ion whose activity is to be determined;

c. retainer means for securing the ion selective membranes in the openings; and

d. porous material in the spaces between the openings in the sensor frame, the porous material, when conductive, providing ionic flow between the ion selective electrodes in the openings.

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**4,713,166**

## PUMP CELL ELEMENT FOR AIR-FUEL RATIO SENSOR

**Takao Kojima, and Hiroyuki Ishiguro, both of Nagoya, Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan**

**Filed Jun. 17, 1986, Ser. No. 875,077**

**Claims priority, application Japan, Jun. 18, 1985, 60-130703**

**Int. Cl.[4] G01N *27/58***

**U.S. Cl. 204—425** **15 Claims**

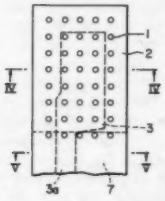
1. A pump cell element for an air-fuel ratio sensor, the pump cell element comprising:

an oxygen ion conductive zirconia solid electrolyte,

a pair of layer electrodes coated on the both surface areas of a measuring portion, and

ceramic coating layers each coated on each of said electrodes, at least one of said coating layers disposed on the

electrode of a minus side of the pump cell element being provided uniformly and dispersedly with through-pores




having a converted diameter of at least 20 but less than 500 μm.

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**4,713,167**

## MULTIPLE SINGLE-STAGE HYDROCRACKING PROCESS

**Mark E. Reno, Villa Park; Robert K. Olson, Elgin, and Tom N. Kalnes, La Grange, all of Ill., assignors to UOP Inc., Des Plaines, Ill.**

**Filed Jun. 20, 1986, Ser. No. 876,640**
**Int. Cl.[4] C10G 65/10**
**U.S. Cl. 208—59** **17 Claims**

1. A hydrocracking process for converting a heavy hydrocarbonaceous charge stock having an end boiling point greater than about 700° F. into a lower boiling distillate product which comprises the steps of:

(a) reacting said charge stock and hydrogen in a first catalytic hydrocracking reaction zone at hydrocracking conditions to obtain a first hydrocracked effluent stream comprising distillate hydrocarbons boiling in a distillate product range and uncoverted charge stock boiling above about 700° F.;

(b) passing said hydrocracked effluent stream and a second hydrocracked effluent stream from a second catalytic hydrocracking reaction zone into a separation zone;

(c) withdrawing from said separation zone a vaporous phase comprising hydrogen and a liquid hydrocarbon phase comprising hydrocarbons boiling in a distillate product range and unconverted charge stock;

(d) fractionating said liquid hydrocarbon phase into a light hydrocarbon stream comprising at least a portion of said hydrocarbons boiling in a distillate product range, a middle hydrocarbon stream comprising at least a portion of said hydrocarbons boiling in a distillate product range, said light hydrocarbon stream having a boiling range which is lower than the boiling range of the middle hydrocarbon stream, and a heavy hydrocarbon stream comprising unconverterd charge stock boiling above about 700° F.;

(e) reacting at least a portion of said middle hydrocarbon stream comprising at least a portion of said hydrocarbons boiling in a distillate product range and hydrogen in a second catalytic hydrocracking reaction zone at hydrocracking conditions to convert said middle hydrocarbon stream to lower boiling hydrocarbons boiling in a distillate product range;

(f) recycling at least a portion of said heavy hydrocarbon stream comprising unconverted charge stock boiling above about 700° F. to said first catalytic hydrocracking reaction zone; and

(g) withdrawing said light hydrocarbon stream.

**4,713,168**

## PREMIUM COKING PROCESS

**Bruce A. Newman, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.**

**Filed Aug. 29, 1986, Ser. No. 901,851**
**Int. Cl.[4] C10G 9/14**
**U.S. Cl. 208—131** **2 Claims**

1. In a delayed premium coking process in which an aromatic mineral oil feedstock is heated to an elevated temperature and introduced into a coking drum under delayed coking conditions, the improvement comprising:

(a) determining the time required at said coking conditions to obtain a calcining yield of from 70 to 85 weight percent; and

(b) adding a Lewis acid to said coking drum during only the latter portion of the introduction of feedstock to said coking drum, said latter portion being a period equal to the time determined in step (a), whereby the proportion of +30 mesh coke product resulting is increased without a substantial increase in the CTE of said coke.

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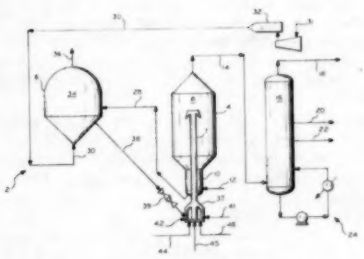
**4,713,169**

## FLUID FEED METHOD

**Richard H. Nielsen, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 689,676, Jan. 8, 1985, abandoned. This application Mar. 19, 1986, Ser. No. 841,148**
**Int. Cl.[4] C10G 11/18**
**U.S. Cl. 208—157** **5 Claims**



1. A fluid feeding method comprising:

injecting an oil feedstock and an atomizing fluid for atomizing the oil feedstock from a plurality of nozzles which empty into a chamber defined by the interior surface of a hollow member which has an axis and an open end which defines an opening, wherein at least a portion of the interior surface progressively tapers toward the axis from the open end to an interior surface boundary axially opposite the open end, the oil feedstock and atomizing fluid being injected from the nozzles into the area of the chamber within said interior surface portion and toward the opening so as to exit the chamber through the opening, wherein topped crude oil is injected from a first position within said chamber and wherein slurry oil is injected from a second position within said chamber, said second position being radially spaced farther from the axis than said first position, where radial spacing is measured along lines perpendicular to the axis;

introducing a fluidized cracking catalyst adjacent to the opening such that the oil feedstock exiting the chamber and the catalyst mix to yield a mixture; and

passing the mixture through a riser reactor.

**4,713,170**

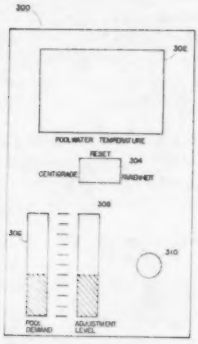
## SWIMMING POOL WATER PURIFIER

**Darryl S. Saibic, Plantation, Fla., assignor to Florida Development and Manufacturing, Inc., Deerfield Beach, Fla.**

**Filed Mar. 31, 1986, Ser. No. 846,308**

**Int. Cl.**[4] **C25B** *9/04, 15/00*

**U.S. Cl. 210—85** **11 Claims**




**10**. An apparatus for purifying swimming pool water comprising:

housing means including a water inlet means and a water outlet means suitable for coupling to a swimming pool filtration system, said inlet and said outlet being approximately diametrically opposed to allow water to flow in a path from said inlet to said outlet without change in water direction;

an anode composed substantially of copper, said anode disposed within said path of water flow;

a cathode disposed within said path of water flow;

means for measuring temperature of said water;

circuit means for converting said temperature to a first figure of merit and for graphically displaying said figure of merit; and

a manually adjustable current source for allowing adjustment of current passing between said anode and said cathode and for graphically displaying a measure of said current in the same manner as said figure of merit is displayed.

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**4,713,171**

## APPARATUS FOR REMOVING WATER FROM BLOOD

**Hans-Dietrich Polaschegg, Oberursel, Fed. Rep. of Germany, assignor to Fresenius AG, Bad Homburg, Fed. Rep. of Germany**

**Filed Jan. 27, 1984, Ser. No. 574,492**

**Claims priority, application Fed. Rep. of Germany, Jan. 28, 1983, 3302804**

**Int. Cl.**[4] **A61M** *1/14, 1/34;* **B01D** *13/00*

**U.S. Cl. 210—110** **22 Claims**

**1**. In an apparatus for removing water from blood including an extracorporeal circulation circuit, said extracorporeal circulation circuit having a blood inlet side and a blood outlet side, a supply line on the blood inlet side and having an upstream end and a downstream end, an offtake line on the blood outlet side and having an upstream end and a downstream end, and a filter having a filtrate side and a blood side, said filter being connected to said downstream end of said supply line and said upstream end of said offtake line, said upstream end of said supply line and said downstream end of said offtake line being connected to at least one blood connection, said supply line including therein a blood pump, a first clamp disposed upstream of said blood pump and a second clamp disposed downstream of said blood pump, said offtake line further including therein a third clamp, the improvement comprising:

a filtrate connection **(38)** on said filtrate side connected to said filter **(32)**;

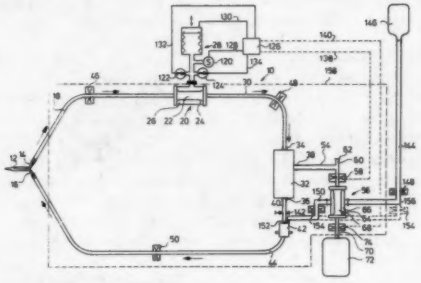
an inlet tube **(54)** connected to said filtrate connection **(38)**;

means for limiting the volume of water removed from blood in the circuit in one machine cycle to a predetermined volume $V_2$, said limiting means comprising an ultrafiltrate measuring chamber **(56)**, said ultrafiltrate measuring chamber having an inlet connection coupled to said inlet tube **(54)** and an outlet connection, said ultrafiltrate measuring chamber **(56)** being coupled at its inlet connection through said inlet tube **(54)** to said filtrate connection and having a restricted maximum intake volume $V_2$;

an inlet tube **(70)** coupled to said outlet connection;

a fourth clamp **(58)** on said inlet tube **(54)** and a fifth clamp **(74)** on said outlet tube **(70)**; and

control means **(126)** coupled to said first clamp, to said second clamp, to said third clamp, to said fourth clamp and to said fifth clamp, said control means **(126)** being operative to open and close said first clamp and said second clamp in opposition to one another, to open and close said third clamp in synchronism with said second clamp, to open and close said fourth clamp in synchronism with said second clamp, and to open and close said fifth clamp in synchronism with said third clamp, said control means being presettable to actuate said clamps **(46, 48, 50, 58, 74)** during a treatment to specify total amounts of fluid to be withdrawn from a patient through said ultrafiltrate measuring chamber;



and wherein said blood pump includes a pump chamber **(20)** in said extracorporeal circulation circuit, the maximum intake volume $V_1$ of the pump chamber **(20)** and the maximum intake volume $V_2$ of the ultrafiltrate measuring chamber **(56)** are in a ratio of between 5:1 and 2:1, thereby controlling the ratio of the amount of blood pumped in a machine cycle to the amount of water removed in a machine cycle.

**20**. In an apparatus for removing water from blood including an arteriovenous extracorporeal circulation circuit, said extracorporeal circulation circuit having a blood inlet side and a blood outlet side, a supply line on the blood inlet side and having an upstream end and a downstream end, and offtake line on the blood outlet side and having an upstream end and a downstream end, and a filter which is connected to said downstream end of said supply line and said upstream end of said offtake line, said upstream end of said supply line and said downstream end of said offtake line being connected to at least one blood connection, said supply line including a therein a blood pump, a first valve means disposed upstream of said blood pump and a second valve means disposed downstream of said blood pump, said offtake line further including therein a third valve means, said filter **(32)** having a filtrate side and a filtrate connection **(38)**, the improvement comprising: means for limiting the volume of water removed from blood in the circuit in one machine cycle to a predetermined volume $V_2$, said limiting means including an ultrafiltrate measuring chamber **(56)**, said ultrafiltrate measuring chamber **(56)** having an

outlet conduit (70) and an inlet conduit (54) and being coupled through said inlet conduit (54) to said filtrate connection, said ultrafiltrate measuring chamber (56) having a restricted maximum intake volume $V_2$; a fourth valve means (58) in said inlet conduit (54) and a fifth valve means (74) in said outlet conduit (70); control means (126) coupled to said first valve means, to said second valve means, to said third valve means, to said fourth valve means and to said fifth valve means, said control means (126) being operative to open and close said first valve means and said second valve means in opposition to one another, to open and close said third valve means in synchronism with said second valve means, to open and close said fourth valve means in synchronism with said second valve means, and to open and close said fifth valve means in synchronism with said third valve means, said control means being presettable to actuate said valve means (46, 48, 50, 58, 74) during a treatment to specify total amounts of fluid to be withdrawn from a patient through said ultrafiltrate measuring chamber; an air separator chamber (42) in said offtake line (40); a throttling means (142) in said offtake line (40) between said filter 32 and said air separator (42); an infusion bag (146) in fluid communication with said air separator (42); wherein said control means (126) is coupled to said throttling means (52) to constrict said offtake line (40) in a controlled manner, and wherein said blood pump includes a pump chamber (20) in said supply line of said extracorporeal circulation circuit and the maximum intake volume $V_1$ of the pump chamber (20) and the maximum intake volume $V_2$ of the ultrafiltrate measuring chamber (56) are in a ratio of between 5:1 and 2:1, thereby controlling the ratio of the amount of blood pumped in a machine cycle to the amount of water removed in a machine cycle.

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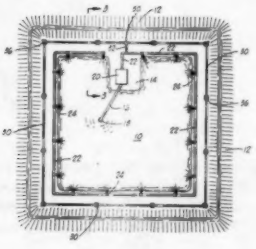
**4,713,172**

## APPARATUS FOR IMPROVED AERATION OF LIQUIDS

**Spencer C. Horn, and Virginia Horn, both of P.O. Box 418, Fort Cobb, Okla. 73038**

**Filed Jun. 16, 1986, Ser. No. 874,643**
**Int. Cl.[4] B01D** *1/16;* **C02F** *1/74*
**U.S. Cl. 210—150** **17 Claims**



1. Apparatus for increasing the air/liquid interface of a body of liquid, comprising:

suction means for drawing liquid from said body;

distribution conduit means connected to said suction means to distribute liquid to selected points around the area wherein the liquid body is contained;

aeration panel means in the form of generally flat, cellular sheet supported vertically upright to expose a generally horizontal top portion and being disposed at a position proximate the liquid body area;

feeder pipe means disposed along said top portion of the panel means, said pipe means including a multiple of spaced liquid discharge openings along said top portion; and

means connecting said distribution conduit means and said feeder pipe means; whereby

liquid is distributed continuously along the panel means top portion for downward flow and distribution over said panel means thereby to increase the air/liquid interface to accelerate evaporation and separation of liquid components.

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**4,713,173**

## THREE ELEMENT AQUARIUM FILTER CARTRIDGE

**Jerome Goldman, New York; Marvin Goldman, Great Neck, and Terry Goldman, New York, all of N.Y., assignors to Penn Plax Plastics, Inc., Garden City, N.Y.**

**Filed Jan. 3, 1986, Ser. No. 816,084**
**Int. Cl.[4] B01D** *27/02, 35/16*
**U.S. Cl. 210—169** **17 Claims**

1. A filter cartridge for aquarium using comprising:

(a) a mechanical filtration element forming a front wall of the filter cartridge;

(b) a back member which is able to let water pass therethrough, forming a back wall of the filter cartridge, the mechanical element and back member sealed to each other around the outer borders thereof;

(c) a chemical filtration element sandwiched between the front wall mechanical filter element end back member, and;

(d) a biological filtration element which is formed from a material selected from the following group consisting of natural sponge, synthetic sponge, and foam, also sandwiched between the front wall mechanical filtration element and the back member, the back member of the filter cartridge being a distinct component from the biological filtration element.

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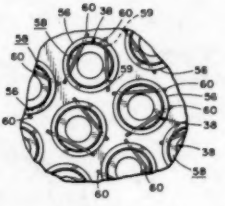
**4,713,174**

## MOUNTING ARRANGEMENT FOR A TUBE-TYPE FILTER ELEMENT

**James F. Zievers, LaGrange, and Paul Eggerstedt, North Riverside, both of Ill., assignors to Industrial Filter & Pump Mfg. Co., Cicero, Ill.**

**Filed Jul. 22, 1986, Ser. No. 888,126**
**Int. Cl.[4] B01D** *27/08, 35/30*
**U.S. Cl. 210—233** **8 Claims**



1. Filter apparatus comprising

a tank having means defining an inlet port and means defining an outlet port;

a generally rigid tube sheet disposed within said tank and adapted to sealably partition said tank between said inlet and outlet ports;

a tubular filter element formed of a porous material for filtering fluid admitted to said tank, said filter element having a hollow, generally cylindrical body portion, said body portion having a proximal end and a distal end;

said distal end being closed;

said proximal end having an integrally formed annular, external flange;

said tube sheet having a circular aperture for receiving said cylindrical body portion of said filter element and further having an upstanding circular wall member coaxially disposed with respect to said aperture;

said wall member having an inside diameter which is larger than the outside diameter of said flange to receive said flange therewithin;

annular sealing means disposed between said flange and said tube sheet;

said wall member having means defining a plurality of through holes; and

pin means extending through said holes across the top of said filter elements,

said pin means bearing against the proximal end of said filter element,

whereby said flange is held by said pin means against said sealing means to form a fluid tight seal between said filter element and said tube sheet.

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**4,713,175**

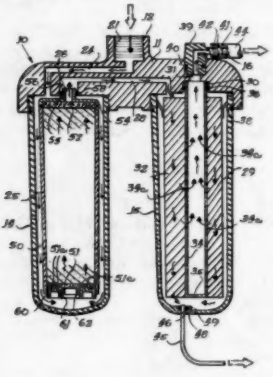
**WATER PURIFIER COMPRISING STAGES MOUNTED SIDE-BY-SIDE TO UNITARY HEADER**

**Donald T. Bray, Escondido, Calif., assignor to Nimbus Water Systems, Inc., Escondido, Calif.**

**Filed Aug. 5, 1986, Ser. No. 893,486**

**Int. Cl.[4] B01D** *13/00*

**U.S. Cl. 210—259** **6 Claims**



**1.** A water purification device having at least three stages for treating pressurized tap water, comprising:

an activated carbon prefilter;

a reverse-osmosis element;

a sediment filter upstream of said activated carbon prefilter to prevent clogging of said activated carbon prefilter with sediment;

a first unitary container containing said activated carbon prefilter and said sediment filter, means connecting said activated carbon prefilter and said sediment filter in serial relationship with said sediment filter upstream of said activated carbon prefilter, and said first unitary container having an open end for releasable attachment to a header;

a second unitary container containing said reverse-osmosis element and having an open end for releasable attachment to a header;

a unitary header including first and second container-attaching means directly releasably attached to the open ends of said first and said second containers, so that said first and said second containers are mounted in side-by-side relationship, means serially connecting said first and said second containers together in serial connection with an upstream unpurified water inlet defined by said unitary header and a downstream purified water outlet channel defined by said unitary header such that said sediment filter and said activated carbon prefilter are connected upstream of said reverse-osmosis element, whereby said sediment filter and said activated carbon prefilter are separately and independently accessible with respect to said reverse-osmosis element to facilitate separate maintenance operations on the respective water purifying components contained within said containers.

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**4,713,176**

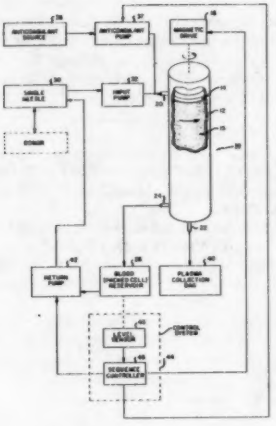
**PLASMAPHERESIS SYSTEM AND METHOD**

**Donald W. Schoendorfer, and Lee E. Hansen, both of Santa Ana, Calif., assignors to Hemascience Laboratories, Inc., Santa Ana, Calif.**

**Filed Apr. 12, 1985, Ser. No. 722,800**

**Int. Cl.[4] B01D** *13/00, 21/26*

**U.S. Cl. 210—645** **10 Claims**



**1.** The method of membrane filtration of at least one selected constituent from a whole blood flow from a blood donor, the blood flow passing adjacent a filtration membrane having pore sizes selected to pass the selected constituent comprising the steps of:

deriving blood including platelets and including the at least one selected constituent from the donor in extraction intervals separated by reinfusion intervals in which unfiltered remainder is returned to the donor;

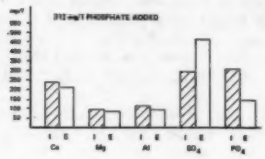
adding anticoagulant to the blood derived from the donor during the extraction intervals, the anticoagulant having an initial pH in the range of 4.5 to 5.5 and being delivered in a ratio of anticoagulant to whole blood in the range 1:6 to 1:25 to establish a pH for the selected constituent in the range of 6.8 to 7.2; and

passing the anticoagulant adjusted whole blood across the filtration membrane during the extraction intervals to filter the selected constituent through the pores in the membrane, with the adjusted whole blood stabilizing the platelets to minimize agglutination tendencies thereof arising because of variations in donor blood characteristics and changes in flow dynamics at the membrane between extraction and reinfusion intervals for minimizing clogging of said membrane.

## 4,713,177
## PROCESS FOR MITIGATING SCALE FORMATION IN TUBE REACTION APPARATUS

**Mark T. Atwood, Arvada, Colo., and Ronald H. Hall, Oakville, Canada, assignors to VerTech Treatment Systems, Inc., Denver, Colo.**

**Filed Dec. 19, 1986, Ser. No. 943,409**
**Int. Cl.⁴ C02F *5/04***
**U.S. Cl. 210—697** **19 Claims**

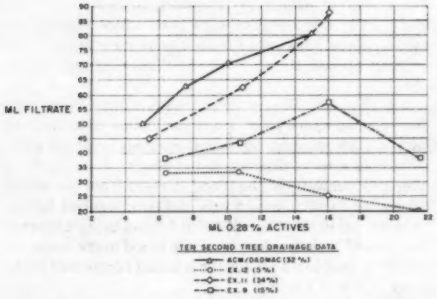



1. A process for inhibiting scale formation in a continuous plug flow vertical tube waste reactor of the type in which liquid waste that contains scale-forming dissolved ions is injected into said reactor as an influent waste stream under heat and pressure to bring about a wet oxidation reaction within said liquid waste in a reaction zone in said reactor to break down said liquid waste into simpler components which are discharged from said reactor as an effluent waste stream, the process comprising adding a quantity of precipitating reagent to said liquid waste before said liquid waste enters said reaction zone and at a temperature significantly below the temperature of said reaction zone to form precipitates containing said ions which would otherwise accumulate as scale on the walls of said reactor.

## 4,713,178
## DEWATERING AGENTS

**Dodd W. Fong, Naperville, and Ann M. Halverson, Wheaton, both of Ill., assignors to Nalco Chemical Company, Naperville, Ill.**

**Continuation-in-part of Ser. No. 737,954, May 28, 1985, abandoned. This application Apr. 14, 1986, Ser. No. 851,172**
**The portion of the term of this patent subsequent to Aug. 5, 2003, has been disclaimed.**
**Int. Cl.⁴ C02F *11/14***
**U.S. Cl. 210—734** **2 Claims**



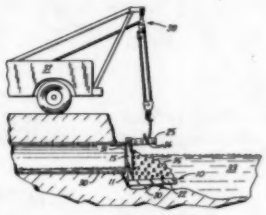

1. In a process of the type wherein organic suspensions comprising raw sewage sludge and sludges obtained by biological degradation are flocculated by adding to the suspension an aqueous solution of a cationic polymer and then dewatered the improvement which comprises treating the raw sewage sludge and sludges obtained by biological degradation with from 0.01–1% by weight based on the weight of the sludge solids with a cationic polymer having an intrinsic viscosity greater than 0.5 and which contains at least 5 mole percent of the dimethyl sulfate or the methyl chloride quaternary ammonium salt of 1-acryloyl-4-methyl piperazine.

2. The process of claim 1 where the cationic polymer is a copolymer of acrylamide which contains between 5–50 mole percent of the dimethyl sulfate or the methyl chloride quaternary ammonium salt of 1-acryloyl-4-methyl piperazine.

## 4,713,179
## REMOVABLE CULVERT GRATE

**Stanley J. Goedderz, Sr., Star Rte., Box 355, Deerwood, Minn. 56444**

**Filed Mar. 14, 1986, Ser. No. 839,689**
**Int. Cl.⁴ B01D *35/28*; E02B *5/08***
**U.S. Cl. 210—747** **10 Claims**



9. A method of clearing debris away from the inlet of a water passageway comprising the steps of:

a. providing a removable grate assembly having a vertical grate which permits the flow of water therethrough while substantially preventing the flow of debris therethrough, a horizontal platform joined to the vertical grate at the lower edge thereof, forming a generally right angle therewith, and linkage means comprising a bar extending from the upper edge of the vertical grate generally normal to the plane of the grate in the same direction as the horizontal platform;

b. placing the grate assembly adjacent the inlet of the passageway with the platform extending away therefrom;

c. allowing debris to collect adjacent the vertical grate and above the horizontal platform; and

d. lifting the grate assembly away from the opening by a power source attached to the bar, the horizontal platform carrying with it the debris.

## 4,713,180
## CERAMIC FILTER AND METHOD FOR USING SAME

**Franz Hofmann, Neuhausen; Hans G. Trapp, Schaffhausen, both of Switzerland; Rolf Rietzscher, Mettmann, Fed. Rep. of Germany; Jürgen Otto, Hattingen, Fed. Rep. of Germany; Wolfgang Kaettlitz, and Gerd Trinki, both of Borken, Fed. Rep. of Germany, assignors to Georg Fischer Aktiengesellschaft, Schaffhausen, Switzerland**

**Filed Feb. 13, 1985, Ser. No. 701,135**
**Claims priority, application Switzerland, Feb. 15, 1985, 731/84**
**Int. Cl.⁴ B01D *29/32***
**U.S. Cl. 210—773** **18 Claims**

10. A method for filtering molten iron which comprises:

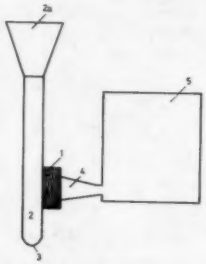
(a) providing a flowing mass of molten iron;

(b) providing a ceramic filter made from a high melting ceramic material and having an open-celled foam structure with at least one afflux surface for filtering molten cast iron, said ceramic filter comprising an interior region surrounded by an outer region wherein the bulk density of the outer region of said ceramic filter is higher than the bulk density of the interior region of said ceramic filter, said ceramic material comprising 20–70% by weight of silicon carbide, 10–40% by weight of aluminum oxide,

2–20% by weight of silicon oxide, and 10–30% by weight of a refractory inorganic binder,

(c) positioning said ceramic filter in a casting system near the location where the molten iron has its highest kinetic energy; and

(d) causing the mass of molten iron to flow tangentially by the afflux surface of said ceramic filter and creating turbulent flow in front of the afflux plane of said ceramic filter thereby causing the mass of molten iron to pass through said ceramic filter.



17. A ceramic filter made from a high-melting ceramic material and having an open-cell foam structure, with at least one afflux surface, said ceramic filter comprising an interior region surrounded by an outer region, wherein the bulk density of the outer region of said ceramic filter is higher than the bulk density of the interior region of said ceramic filter, said ceramic material comprising 20–70% by weight of silicon carbide, 10–40% by weight of aluminum oxide, 2–20% by weight of silicon oxide, and 10–30% by weight of a refractory inorganic binder.

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**4,713,181**

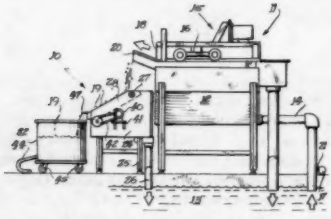
**METHOD AND APPARATUS FOR HANDLING SLUDGE**

**Frederick E. Russell, Elgin, Ill., assignor to Protectaire Systems Co., Elgin, Ill.**

**Filed Mar. 18, 1986, Ser. No. 841,078**

**Int. Cl.[4] B01D** *33/00;* **C02F** *1/40*

**U.S. Cl. 210—776** **4 Claims**



1. An apparatus for separating and dewatering floating wet sticky, agglomerated paint sludge from a body of water and for dewatering the wet sludge to a dried sludge, said apparatus comprising means for providing a paint sludge sufficiently dry for enabling open transport and placement thereof in unlined landfills, including, a skimmer device having inlet means for connection to a reservoir to receive water bearing the sticky paint sludge and having a skimmer for skimming floating sticky paint sludge from the water and for discharging the skimmed sticky paint wet sludge,

a porous conveyor means having a porous flexible screen receiving the wet paint sludge from said skimmer device and for conveying the wet sticky paint sludge,

a supply roll of said porous flexible screen being wound in a roll and being unwound to provide a clean portion of screen to receive the wet sticky paint sludge,

and means to impart a squeezing action on the wet sticky paint sludge to squeeze sufficient water therefrom to cause reclassification of the wet paint sludge to dry paint sludge.

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**4,713,182**

**FIRE-FIGHTING FOAM**

**Ralph H. Hiltz, Allison Park; John S. Greer, Ellwood City, and Joseph V. Friel, Butler, all of Pa., assignors to Mine Safety Appliances Company, Pittsburgh, Pa.**

**Filed Nov. 6, 1986, Ser. No. 927,386**

**Int. Cl.[4] A62D** *1/00;* **B01J** *13/00;* **C09K** *3/00;* **B01F** *17/00*

**U.S. Cl. 252—3** **8 Claims**

1. A foam concentrate for forming a fire-fighting foam comprising an essentially aqueous solution containing between about

4% and 6% by weight citrus pectin,

3% and 9% by weight alkylbetaine surfactant,

9% and 20% by weight sodium alkyl sulfate surfactant having 8 to 13C atoms, and,

4% and 12% by weight alkoamphoglycinate or alkoamphopropionate surfactant, the toal amount of surfactant being at least 30% by weight and the viscosity of the concentrate being less than about 1000 cp. at room temperature.

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**4,713,183**

**OIL BASED DRILLING FLUID REVERSION**

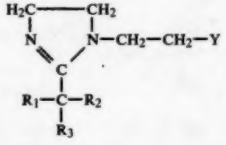
**Arvind D. Patel, Houston, and Carmelita Salandanan, Sugarland, both of Tex., assignors to Dresser Industries, Inc., Dallas, Tex.**

**Filed Mar. 12, 1986, Ser. No. 838,975**

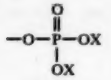
**Int. Cl.[4] C09K** *7/06*

**U.S. Cl. 252—8.515** **15 Claims**

1. In a petroleum oil, mud drilling fluid that has undergone conversion of at least a portion of the solid particles therein from an oil wet stage to a water wet stage, the process for substantially converting the water wet particles to an oil wet state comprising adding to the water wet drilling mud a water soluble imidazoline having the general formula



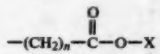
wherein Y is (1) a phosphate group



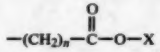
wherein X is —H, —$NH_3$, or an alkali metal cation, (2) —OH, (3) —$NH_2$, (4) an amide

or (5) an ester

wherein R is an alkyl radical containing 1 to 12 carbon atoms; $R_1$ is (1) —H, (2) an alkyl radical containing 1 to 6 carbon atoms, or (3)



wherein n is an integer from 1 to 4 and X is —H, —$NH_3$, or an alkali metal cation; $R_2$ is an alkyl carboxylate radical of the formula



wherein n is an integer from 1 to 4, X is —H, —$NH_3$, or an alkali metal cation; and $R_3$ is an alkyl radical containing 1 to 14 carbon atoms.

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**4,713,184**

## DISPERSED OIL SOLUBLE CORROSION INHIBITOR AND WATER SOLUBLE PHOSPHONATE SCALE INHIBITOR COMPOSITION

**Najib H. Zaid, 213 E. Monroe, Sterling, Kans. 67579**

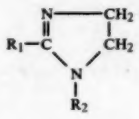
**Filed Sep. 26, 1985, Ser. No. 780,449**

**Int. Cl.[4] E21B *37/00*; C23F *11/14***

**U.S. Cl. 252—8.552** **30 Claims**

1. A corrosion and scale inhibiting preblend composition comprising:

from about 2 to 25% by weight of an imidazoline wherein said imidazoline is selected from the group consisting of compounds having the following structural formula:



wherein $R_1$ is hydrogen or an alkyl group having up to 18 carbon atoms therein, and $R_2$ is hydrogen, or an alkyl or amine group having up to 18 carbon atoms therein;

from about 2 to 35% by weight of oligomers of $C_{12}$–$C_{22}$ fatty acids;

from about 2 to 25% by weight of a scale inhibitor selected from the group consisting of organophosphonic acids and salts thereof; and

from about 2 to 50% of a nonylphenol ethyoxylate surfactant having about 6 ethylene oxide groups per molecule,

said composition being in the form of a liquid homogeneous dispersion.

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**4,713,185**

## SACRIFICIAL AGENTS FOR ENHANCED OIL RECOVERY

**John Howard, Vancouver, and Marie Stirling, Surrey, both of Canada, assignors to Canadian Patents and Development Ltd., Ottawa, Canada**

**Filed Mar. 25, 1985, Ser. No. 715,368**

**Int. Cl.[4] E21B *43/22***

**U.S. Cl. 252—8.554** **3 Claims**

1. In a method of obtaining oil from a subterranean rock formation which comprises displacing the oil from the formation by a waterflood technique employing a surfactant to improve the miscibility of the oil and the water and a sacrificial agent to reduce the amount of the surfactant required, the improvement which comprises employing as said sacrificial agent an oxidized and/or chlorinated lignin derivative obtained from dilute caustic bleach plant effluent liquor by a concentration and purification step capable of separating said derivative from other components of said liquor and selected from the group consisting of adsorption of said derivative by a macroporous resin followed by elution, reverse osmosis and membrane dialysis; and wherein said derivative is complexed with iron ions prior to use in said waterflood technique.

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**4,713,186**

## LUBRICANT ADDITIVE IN POWDER TO PASTE FORM

**Ulrich Kristen, Rheinfelden; Ulrich Häring , Riehen; Francis Fischer, Sins, and Alain Cron, Hildisrieden, all of Switzerland, assignors to Lonza Ltd., Gampel and Ciba-Geigy A.G., Basel, both of, Switzerland**

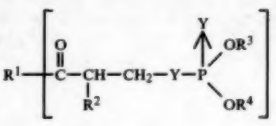
**Filed Aug. 20, 1986, Ser. No. 898,193**

**Claims priority, application Switzerland, Sep. 9, 1985, 03880/85**

**Int. Cl.[4] C10M *125/02, 125/00, 137/10***

**U.S. Cl. 252—30** **25 Claims**

1. Composition which has been obtained by mixing and/or grinding at least one phosphate and at least one solid lubricant component, said composition containing from 10 to 50 percent by weight of the phosphate and 50 to 90 percent by weight of the solid lubricant component, the phosphate having formula III:



(III)

wherein X and Y are the same or different and are oxygen or sulfur, $R^1$ is an alkoxy radical which is derived from an aliphatic $C_2$–$C_{20}$ alcohol having 1 to 4 hydroxy groups, $R^2$ is hydrogen or $C_1$–$C_3$ alkyl, $R^3$ and $R^4$ are the same or different and are $C_1$–$C_{20}$ alkyl, $C_5$–$C_8$ cycloalkyl, or phenyl or naphthyl unsubstituted or substituted with one to three $C_1$–$C_8$ alkyl groups, and t is a whole number from 1 to 4 which corresponds to the functionality of the alcohol from which radical $R^1$ is derived, and the at least one solid lubricant component being graphite, a bisulfide or selenide of Mo, Nb, Ta, Ti or W, boron nitride, lead sulfide, an intercalation compound of graphite with $NiCl_2$, $CoCl_2$, $FeCl_3$, $CuCl_2$, $CrCl_3$, $YCl_3$, $PtCl_4$, $RuCl_3$, $PdCl_2$, $RhCl_3$ or $AlCl_3$, an intercalation compound of graphite with Co, Ni, Fe, Cu, Rh, Pt, Pd or Ru, and a graphite fluoride $(CF_x)_n$, wherein x is greater than one.

11. Process for the production of a lubricant additive in powder to paste form for lubricating oils and lubricating greases comprising mixing and comminuting 10 to 50 percent by weight of at least one phosphate as defined in claim 1 and 50 to 90 percent by weight of at least one solid lubricant component by bringing them into mutual contact in a mixing and/or comminuting device.

4,713,187

## LUBRICATING OIL COMPOSITIONS CONTAINING MODIFIED SUCCINIMIDES (V)

Thomas F. Buckley, III, Hercules, and Robert H. Wollenberg, San Rafael, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 819,770, Jan. 26, 1986, Pat. No. 4,647,390, which is a continuation-in-part of Ser. No. 722,910, Apr. 12, 1985, abandoned. This application Mar. 2, 1987, Ser. No. 20,934

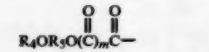
Int. Cl.[4] C10M *133/16*

U.S. Cl. 252—49.6 29 Claims

1. A product prepared by the process which comprises contacting at a temperature sufficient to cause reaction:

(a) a compound selected from the group consisting of boric acid, boron oxides, boron halides and esters of boric acid; and

(b) a polyamino alkenyl or alkyl succinimide wherein one or more of the notrogens of the polyamino moiety is substituted with



wherein $R_4$ is hydroarbyl of from 1 to 30 carbon atoms; $R_5$ is selected from the group consisting of hydrocarbyl of from 2 to 30 carbon atoms and $—R_5—OR_6—_p$ wherein $R_6$ is alkylene of from 2 to 5 carbon atoms and p is an integer from 1 to 100; and m is an integer of from 0 to 1; wherein from about 0.1 equivalents to about 10 equivalents of (a) are employed per equivalent of (b).

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4,713,188

## CARBONATE TREATED HYDROCARBYL-SUBSTITUTED AMIDES

Robert H. Wollenberg, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Jan. 10, 1986, Ser. No. 818,575

Int. Cl.[4] C10M *129/00*

U.S. Cl. 252—51.5 A 10 Claims

1. A lubricating oil composition comprising an oil of lubricating viscosity and a dispersant effective amount of a product prepared by the process which comprises contacting at a temperature sufficient to cause reaction a hydrocarbyl-substituted amide of the formula

wherein

$R_7$ is hydrocarbyl of from 12 to 350 carbon atoms;

$R_8$ is alkylene of from 2 to 6 carbon atoms;

and a is an integer from 1 to 10;

with a cyclic carbonate wherein the molar charge of the cyclic carbonate to the basic nitrogen of the hydrocarbyl-substituted amide is from about 0.2:1 to about 10.1.

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4,713,189

## PRECOUPLED MONO-SUCCINIMIDE LUBRICATING OIL DISPERSANTS AND VITON SEAL ADDITIVES

Theodore E. Nalesnik, Beacon, and Nicholas Benfaremo, Wappingers Falls, both of N.Y., assignors to Texaco, Inc., White Plains, N.Y.

Filed Aug. 20, 1986, Ser. No. 898,275

Int. Cl.[4] C10M *133/16*

U.S. Cl. 252—51.5 A 14 Claims

1. A lubricating oil composition comprising a major portion of a lubricating oil and a minor dispersant amount of a reaction product prepared by a process which comprises:

(a) reacting a polyethyleneamine with a phenolic compound in the presence of excess formaldehyde to form a Mannich phenol coupled polyethyleneamine;

(b) reacting said Mannich phenol coupled polyethyleneamine with an alkenyl succinic acid anhydride to form a Mannich phenol coupled mono-alkenyl succinimide;

(c) acylating said coupled mono-alkenyl succinide with glycolic acid to form a glycolated Mannich phenol coupled mono-alkenyl succinimide; and

(d) recovering said glycolated Mannich phenol coupled mono-alkenyl succinimide.

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4,713,190

## MODIFIED CARBOXYLIC AMIDE DISPERSANTS

Timothy R. Erdman, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Oct. 23, 1985, Ser. No. 790,578

Int. Cl.[4] C10M *131/12, 133/56*

U.S. Cl. 252—51.5 A 14 Claims

1. A hydrocarbon-soluble product produced by the process which comprises reacting at a temperature sufficient to cause reaction:

(a) a carboxylic amide containing at least one basic nitrogen wherein said carboxylic amide is derived from an aliphatic carboxylic acid containing 12 to 350 aliphatic carbon atoms; and

(b) a fluorine-containing acid selected from the group consisting of fluorophosphoric acid, boron trifluoride, fluoboric acid and the ammonium salts or complexes thereof wherein the amount of said flourine-containing acid is from about 0.1 to 1 equivalent per equivalent of basic nitrogen atom.

7. A lubricating oil composition comprising an oil of lubricating viscosity and a dispersant effective amount of the product of claim 1.

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4,713,191

## DIISCYANATE ACID LUBRICATING OIL DISPERSANT AND VITON SEAL ADDITIVES

Theodore E. Nalesnik, Wappingers Falls, N.Y., assignor to Texaco Inc., White Plains, N.Y.

Filed Dec. 29, 1986, Ser. No. 946,750

Int. Cl.[4] C10M *133/16*

U.S. Cl. 252—51.5 A 13 Claims

1. A lubricating oil composition comprising a major portion of a lubricating oil and a minor dispersant amount of a reaction product prepared by the process which comprises:

(a) reacting a polyethylene amine with an alkenyl succinic acid anhydride to form a bis-alkenyl succinimide;

(b) acylating said bis-alkenyl-succinimide with glycolic acid to form a partially glycolated bis-alkenyl succinimide;

(c) adding a diisocyanate to partially or fully glycolated bis-succinimide thereby forming a diurea or respective urethane coupled glycamide bis-alkenyl succinimide; and

(d) recovering said diurea or urethane coupled glycamide bis-alkenyl succinimide.

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4,713,192

## DOPING OF CATENATED PHOSPHORUS MATERIALS

Christian G. Michel, Ossining; Rozalie Schachter, New York, both of N.Y.; Mark A. Kuck, Upper Montclair, N.J.; John A. Baumann, Dobbs Ferry, N.Y., and Paul M. Raccah, Chicago, Ill., assignors to Stauffer Chemical Company, Westport, Conn.

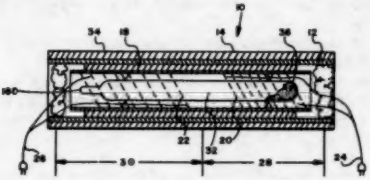
Division of Ser. No. 442,208, Nov. 16, 1982, Pat. No. 4,508,931, which is a continuation-in-part of Ser. No. 335,706, Dec. 30, 1981, abandoned, and a continuation-in-part of Ser. No. 419,537, Sep. 17, 1982, Pat. No. 4,620,968, which is a continuation-in-part of Ser. No. 335,706, Dec. 30, 1981, abandoned. This application Dec. 4, 1984, Ser. No. 677,911

Int. Cl.[4] H01L *21/34, 21/38*

U.S. Cl. 252—62.3 R 8 Claims

1. A method of fabricating a semiconductor device including

the step of condensing a high phosphorus alkali metal polyphosphide from the vapor phase in the presence of an alkali metal.




2. A method of fabricating a semiconductor device including the step of doping a high phosphorus alkali metal polyphosphide with another pnictide to substitute said other pnictide for parts of said phosphorus of said alkali metal polyphosphide.

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**4,713,193**

## STABLE, FREE-FLOWING PARTICULATE ADJUNCTS FOR USE IN DETERGENT COMPOSITIONS

**Ho Tan Tai, Lille, France, assignor to Lever Brothers Company, New York, N.Y.**

**Continuation of Ser. No. 669,152, Nov. 7, 1984, abandoned. This application Jul. 15, 1986, Ser. No. 884,664**

**Claims priority, application United Kingdom, Nov. 9, 1983, 8329880**

**Int. Cl.[4] C11D** *3/12, 3/37, 11/02, 17/06*

**U.S. Cl. 252—91** **5 Claims**

1. Stable, free-flowing, particulate adjunct suitable for use in particulate detergent compositions consisting essentially of a spray-dried zeolite granular material having absorbed therein a liquid, viscous liquid, oily or waxy adjunct in an amount of from at least about 54% up to 100% of its weight, said granular zeolite material consisting essentially of 65 to 85% by weight of zeolite and 15 to 35% by weight of sodium sulphate and water, and having a particle size distribution of between 50 and 500 microns, and a bulk density of from 450 to 600 g/l.

5. Stable, free-flowing, particulate adjunct suitable for use in particulate detergent compositions consisting essentially of a spray-dried zeolite granular material having absorbed therein a liquid silicone oil in an amount of from 25% up to 100% of its weight, said granular zeolite material consisting essentially of 65 to 85% by weight of zeolite and 15 to 35% by weight of sodium sulphate and water, and having a particle size distribution of between 50 and 500 microns, and a bulk density of from 450 to 600 g/l.

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**4,713,194**

## BLOCK POLYESTER AND LIKE COMPOUNDS HAVING BRANCHED HYDROPHILIC CAPPING GROUPS USEFUL AS SOIL RELEASE AGENTS IN DETERGENT COMPOSITIONS

**Eugene P. Gosselink, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Apr. 15, 1986, Ser. No. 852,258**

**Int. Cl.[4] C11D** *17/00*

**U.S. Cl. 252—174.23** **35 Claims**

18. A detergent composition which comprises:

(a) from about 1 to about 75% by weight of a nonionic, anionic, ampholytic, zwitterionic, or cationic detergent surfactant, or mixture thereof; and

(b) a soil release component which comprises an effective amount of an ester compounds having branched hydrophilic capping groups and oligomer or polymer backbone, said compound having the formula:

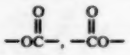
$$X+(OCH_2CH(Y))_n(OR^5)_m+$$

-continued

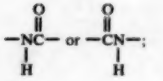
$$+(A-R^1-A-R^2)_u(A-R^3-A-R^2)_v+$$

$$-A-R^4-A+(R^5O)_m(CH(Y)CH_2O)_n+X$$

wherein the A moieties are selected from the group consisting of



and combinations thereof with either or both of the moieties



the $R^1$ moieties are selected from 1,4-phenylene moieties and combinations thereof with other arylene moieties selected from 1,3-phenylene, 1,2-phenylene, 1,8-napthylene, 1,4-napthylene, 2,2'-biphenylene, 4,4'-biphenylene and mixtures thereof; the $R^2$ moieties are selected from ethylene, 1,2-propylene, 1,2-butylene, 1,2-hexylene and 3-methoxy-1,2-propylene moieties and mixtures thereof; the $R^3$ moieties are substituted $C_2$–$C_{18}$ hydrocarbylene moieties having at least one $-SO_3M$, —COOM, $-O-(R^5O)_m(CH(Y)CH_2O)_n-X$ or $-A-(R^2-A-R^4-A)]_w[(R^5O)_m(CH(Y)CH_2O)_n]X$ substituent or at least one moiety $-A-(R^2-A-R^4-A)]_wR^2-A-$ cross-linked to another $R^3$ moiety; the $R^4$ moieties are $R^1$ or $R^3$ moieties, or a mixture thereof; each $R^5$ is $C_3$–$C_4$ alkylene, or the moiety $-R^2-A-R^6-$, wherein $R^6$ is a $C_1$–$C_{12}$ alkylene, alkenylene, arylene or alkarylene moiety; each M is H or a water-soluble cation; the Y substituents of each moiety $-(R^5O)_m(CH(Y)CH_2O)_n]$ are the ether moiety $-CH_2(OCH_2CH_2)_pO-X$ or mixture of said ether moiety and H; each X is H, $C_1$–$C_4$ alkyl or

wherein $R^7$ is $C_1$–$C_4$ alkyl; m and n are numbers such that the moiety $-(CH(Y)CH_2O)$—comprises at least about 50% by weight of the moiety $-(R^5O)_m(CH(Y)CH_2O)_n-$, provided that when $R^5$ is the moiety $-R^2-A-R^6-$, m is 1; each n is at least about 6; p is 0 or at least 1; u and v are numbers such that the sum of u+v is from about 3 to about 25 when w is 0; w is 0 or at least 1; and when w is at least 1, u, v and w are numbers such that the sum of u+v+w is from about 3 to about 25.

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**4,713,195**

## SCALE INHIBITOR

**Burnett M. Schneider, Burlington, Wis., assignor to Aqua-Chem Inc., Milwaukee, Wis.**

**Filed Jan. 30, 1986, Ser. No. 824,230**

**Int. Cl.[4] C02F** *5/14*

**U.S. Cl. 252—180** **8 Claims**

1. A threshold scale inhibitor comprising a mixture of about 10 to 25% by weight of a maleic acid or anhydride homopolymer, about 60 to 75% by weight of an organophosphonate, and about 5 to 25% by weight of a sulfonated styrene-maleic acid or anhydride copolymer.

**4,713,196**

## POLYMER COMPOSITIONS EXHIBITING LIQUID-CRYSTALLINE PHASES

**Klaus Praefcke; Bernd Kohne, both of Berlin; Eike Poetsch, Mühltal, and Claus P. Herz, Heidelberg, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschränkter Haftung, Darmstadt, Fed. Rep. of Germany**

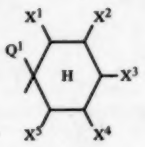
**Filed Aug. 16, 1985, Ser. No. 766,179**

**Claims priority, application Fed. Rep. of Germany, Aug. 18, 1984, 3430482**

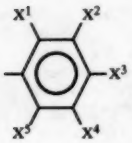
**Int. Cl.[4] C09K** *19/52, 19/06, 19/38;* **G02F** *1/13*

**U.S. Cl. 252—299.01** **16 Claims**

**1.** In a polymer exhibiting a liquid-crystalline phase and having mesogenic groups chemically bonded directly to the polymer backbone or bonded thereto by an acyclic chain spacer group, the improvement wherein the mesogenic groups are groups of the formula Ia, or both Ia and Ib:



Ia



Ib

wherein

$Q^1$ is H, alkyl or alkoxy each of 1-5 C atoms, F, Cl, Br or CN,

each of $X^1$ or $X^5$ independently is H, alkyl of up to 15 C atoms or alkyl of 1-15 C-atoms in which one or two non-adjacent $CH_2$ groups are replaced by —Q—, —S—, —O—CO—O—, —O—CO—NH—, —CO—, —CO—O—, —CO—S—, —S—CO—, —SO— or $—SO_2—$,

with the proviso that at least two of $X^1$ to $X^5$ are different from H.

**14.** In an anisotropic composition comprising an organic polymeric material useful in electromagnetic applications, the improvement wherein the polymer material is an anisotropic polymer material of claim **1**.

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**4,713,197**

## NITROGEN-CONTAINING HETEROCYCLIC COMPOUNDS

**Rudolf Eidenschink, Münster; Joachim Krause, Dieburg; Reinhard Hittich, Modautal; Eike Poetsch, Mühltal; Bernhard Scheuble, Alsbach; Georg Weber, Erzhausen, and Ludwig Pohl, Darmstadt, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Fed. Rep. of Germany**

**Filed Jan. 17, 1985, Ser. No. 692,097**

**Claims priority, application Fed. Rep. of Germany, Jan. 17, 1984, 3401321**

**Int. Cl.[4] C09K** *19/34;* **C07D** *239/26, 239/34, 237/08, 237/14, 241/12, 241/18, 403/06, 403/12, 403/14, 405/06, 405/12, 405/14, 339/08, 319/06*

**U.S. Cl. 252—299.61** **15 Claims**

**1.** In a liquid crystal phase comprising at least two liquid crystalline components, the improvement wherein at least one component is a compound of the formula

$$R^1—(A—Z)_n—A^1—R^2$$

wherein

each of $R^1$ and $R^2$ independently is alkyl of 1-15 C atoms; alkyl of 1-15 C atoms wherein one or two non-adjacent $CH_2$ groups are replaced by O atoms, —O—CO—, —CO—O; and one of $R^1$ and $R^2$ can also be H, CN, F, Cl or Br,

each A independently is 1,4-phenylene (Phe) or 1,4-cyclohexylene (Cy),

each Z independently is —CO—O, —O—CO—, $—CH_2CH_2—$, or a single bond, at most two Z's not being a single bond,

$A^1$ is pyrimidine-2,5-diyl,

n is 3

with the proviso that at least one of the groups A is Cy or at least one group Z is not a single bond.

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**4,713,198**

## HIGH TEMPERATURE PLASTIC SCINTILLATORS

**John J. Simonetti, Cranbury, N.J., assignor to Sangamo Weston, Inc., Norcross, Ga.**

**Continuation-in-part of Ser. No. 604,699, Apr. 27, 1984, Pat. No. 4,578,213. This application Apr. 11, 1985, Ser. No. 722,204**

**The portion of the term of this patent subsequent to Mar. 25, 2003, has been disclaimed.**

**Int. Cl.[4] C09K** *11/06*

**U.S. Cl. 252—301.17** **10 Claims**

**1.** As an article of manufacture, a plastic scintillator which will function at high temperatures and retain as optical properties, said scintillator comprising a polymethylpentene host plastic containing a fluorescent agent, an energy transfer compound to cause energy from the fluorescent agent to be re-radiated at a lower wavelength, a wavelength shifter to absorb energy from the energy transfer agent and re-radiate it at a higher wavelength, a solubility enhancer for the polymethylpentene, and a decolorizing agent.

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**4,713,199**

## DEPOSITORY FOR RADIOACTIVE WASTE AND SPENT FUEL CELLS

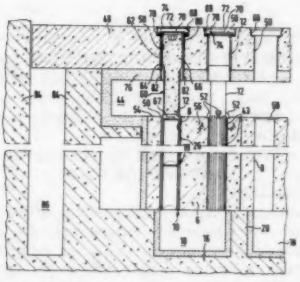
**Harry Spilker, Talstrasse 3, D-3252 Bad Münder 2; Rainer Rox, Grethenweg 68, D-6000 Frankfurt/M. 70, and Heinz-Walter Peschl, Die Ritterwiesen 8, D-6237 Liederbach, all of Fed. Rep. of Germany**

**Continuation of Ser. No. 699,082, Feb. 7, 1985, abandoned. This application Jul. 28, 1986, Ser. No. 889,638**

**Claims priority, application Fed. Rep. of Germany, Feb. 8, 1984, 3404329**

**Int. Cl.[4] G21F** *9/12, 9/24, 5/00*

**U.S. Cl. 252—633** **19 Claims**



**1.** Modular-system depository for dry storage of radioactive waste containers and spent fuel cells comprising a concrete storage block on a concrete base, said concrete storage block containing vertical channels for storing and cooling said radioactive waste and fuel cells, and a cover,

said storage block being composed of a plurality of individ-

ual concrete blocks each having a plurality of vertical storage and cooling channels extending therethrough,

said concrete blocks being stacked beside and on top of one another with said vertical channels in alignment, at least one said container or fuel cell being disposed in each said channel,

said concrete blocks having said channels being arranged in essentially equal modular grids and having the same dimensions, a plurality of stacked concrete blocks forming a block segment and a plurality of block segments forming a storage block, said block segments being spaced from said concrete base, the spaces between the bottom of the block segments and the concrete base forming intake air conduits communicating with said vertical storage and cooling channels.

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**4,713,200**

**PESTICIDAL COMPOUNDS**

**Robert J. Blade, Berkhamsted, England, assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.**

**Filed Mar. 29, 1985, Ser. No. 717,449**

**Claims priority, application United Kingdom, Apr. 3, 1984, 8408566; Apr. 11, 1984, 8409361; Aug. 15, 1984, 8420753; Nov. 21, 1984, 8429372**

**Int. Cl.[4] C11C *1/00, 3/00***

**U.S. Cl. 260—408** **1 Claim**

1. The compound 11-(3'-trifluoromethylbenzyloxy)-(2E,-4E)-undecadienoic acid.

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**4,713,201**

**PROCESS FOR THE PREPARATION OF SALTS OF A DICARBOXYLIC ACID AND A DIAMINE**

**Georg Pilz, Neustadt; Gert Buerger, Mannheim; Manfred Barl, Otterstadt, and Gerhard Thiel, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Jun. 18, 1986, Ser. No. 875,547**

**Claims priority, application Fed. Rep. of Germany, Jun. 21, 1985, 3522216**

**Int. Cl.[4] C07C *83/00***

**U.S. Cl. 260—501.17** **3 Claims**

1. A process for the preparation of a salt of a dicarboxylic acid and a diamine of the formula

$$H_2N—(R^1—O)_n—R^2—NH_2 \qquad I,$$

where $R^1$ and $R^2$ may be identical or different and are each alkylene of 2 to 4 carbon atoms and n is an integer from 1 to 3, which comprises: reacting a dicarboxylic acid and a diamine of the formula I which contains hydrazine in the form of hydrazine hydrate, in an aqueous solution at a temperature of from 50° to 95° C.

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**4,713,202**

**PROCESS FOR REDUCING THE DISTORTION OF MULTI-LAYERED LAMINATES**

**Llewellyn D. Booth, Lake Jackson, Tex., and Arie Cohen, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed May 6, 1985, Ser. No. 730,523**

**Int. Cl.[4] B29C *35/16, 71/00, 67/20***

**U.S. Cl. 264—46.5** **9 Claims**

1. In a process for preparing a multilayer composite structure whereby the structure is produced at an elevated temperature, wherein the structure

(i) tends to distort upon changes in temperature,

(ii) comprises at least two layers of different materials, at least one of which creeps at the elevated temperature at which the structure is prepared, and

(iii) contains no layers which creep significantly at ambient temperature,

the improvement which comprises cooling said structure such that at least one of the layer(s) which creeps at said elevated temperature is cooled to a temperature at which it does not significantly creep at a rate which is at least 50% less than the natural cooling rate thereof, and while the rate of cooling of at least one other layer in said composite, which layer has a greater coefficient of expansion and a higher elastic modulus than the layer(s) whose rate of cooling is retarded, is accelerated with respect to its natural cooling rate, thereby reducing or eliminating distortion in the cooled structure.

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**4,713,203**

**BAUXITE PROPPANT**

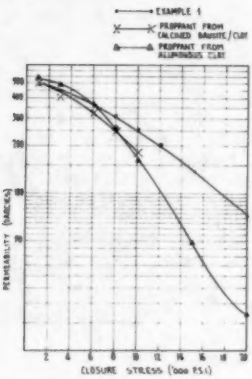
**William H. Andrews, Mt. Waverley, Australia, assignor to Comalco Aluminium Limited, Victoria, Australia**

**Filed Dec. 24, 1985, Ser. No. 812,984**

**Claims priority, application Australia, May 23, 1985, PH0703; Jul. 1, 1985, PH1268**

**Int. Cl.[4] C04B *35/10***

**U.S. Cl. 264—117** **10 Claims**




1. A process for manufacture of a sintered bauxite suitable for use as a proppant comprising the following steps:

(a) separating a fine fraction from a naturally occuring bauxite containing same, said fine fraction being an uncalcined natural bauxite fraction composed largely of monomineraallic particles of gibbsite, boehmite and kaolinite, the kaolinite responding no more than 25% of the total, said particles having a size range from 0.02 to 0.3 micrometers;

(b) pelletizing the separated fine fraction in the presence of water;

(c) treating the pellets produced in step (b) to remove water therefrom;

(d) sintering the product of step (c) to produce sintered bauxite suitable for use as a proppant, said sintered bauxite having a density of less than 3.4.

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**4,713,204**

**PROCESS OF MANUFACTURING A ONE-PIECE MOLDING FROM A DRY CERAMIC MASS**

**Rolf Jung, Trier, Fed. Rep. of Germany, assignor to Laeis-Werke AG, Trier, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 542,772, Oct. 17, 1983, abandoned. This application Nov. 14, 1985, Ser. No. 798,167**

**Claims priority, application Fed. Rep. of Germany, Oct. 16, 1982, 3238389**

**Int. Cl.[4] B29C *43/04***

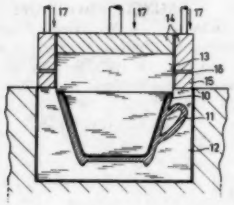
**U.S. Cl. 264—120** **5 Claims**

1. A process for fabricating one-piece moldings from a dry ceramic mass, having deep handles, comprising the steps of

(a) filling a mold cavity which defines the shape of the

molding with a sprayed granular ceramic mass via feed channel means;

(b) said mold cavity being formed by a divided punch and a divided mold matrix, said punch and mold matrix having molding surfaces which contact the ceramic mass during molding; at least said molding surfaces being made of synthetic material, an inner contour of said molding being matingly shaped with respect to said divided punch and an outer contour of said molding being matingly shaped with




respect to said mold matrix, said mold matrix and punch defining a mold cavity for handle or grip there between, a dividing plane of said mold bisecting said handle or grip;

(c) applying pressure to said sprayed granular ceramic mass in said mold cavity via said divided punch to mold said ceramic mass in said mold cavity; and

(d) said mold matrix and punch coact in such a way during the molding process that over a predetermined period of molding time different pressures are applied via the punch to the molding.

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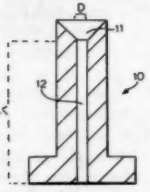
**4,713,205**

## METHOD FOR REDUCING MELT FRACTURE DURING EXTRUSION OF LINEAR POLYETHYLENE HOMOPOLYMERS AND COPOLYMERS BY VARYING THE GEOMETRY OF THE DIE EXIT FACE

**Tien-Kuei Su, Pittsford, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Sep. 25, 1985, Ser. No. 780,051**
**Int. Cl.[4] B29C** *47/12, 47/20*
**U.S. Cl. 264—176.1** **4 Claims**




1. In a method for extruding a linear homopolymer and/or copolymer of ethylene obtained from the polymerization of ethylene with up to 10 mol percent of a $C_{3-6}$ alpha olefin in which said linear homopolymer and/or copolymer is extruded through a first die having a first aspect ratio that exceeds 10 and under conditions of temperature and shear rate as to provide an extrudate exhibiting significant melt fracture, the improvement which comprises extruding said linear homopolymer and/or copolymer at said temperature and shear rate but substituting for said first die, a second die having a maximum aspect ratio of 10, said second die providing an extrudate of significantly reduced melt fracture.

**4,713,206**

## PROCESS FOR DEWAXING CERAMIC MOLDED BODIES

**Tadaaki Matsuhisa, Kasugai, and Shingo Sasaki, Kuwana, both of Japan, assignors to NGK Insulators, Ltd., Japan**

**Filed Mar. 4, 1985, Ser. No. 707,680**
**Claims priority, application Japan, Mar. 16, 1984, 59-52030**
**Int. Cl.[4] B29C** *71/02;* **C04B** *35/64*
**U.S. Cl. 264—328.2** **12 Claims**

1. A process for dewaxing a ceramic molded body comprising:

forming an injection molded ceramic body, said ceramic body containing a wax-series binder;

placing said molded body upon a honeycomb ceramic body; and

heating said molded ceramic body to remove said wax-series binder therefrom.

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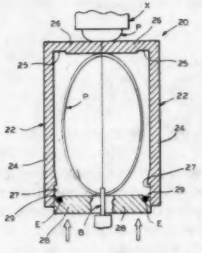
**4,713,207**

## MANUFACTURING METHOD FOR THERMOPLASTIC CONTAINER WITH INTEGRAL LIFTING RING

**Theodore H. Udell, West Chester, Pa., and David R. Koller, Wilmington, Del., assignors to Container Corporation of America, Alton, Ill.**

**Filed Jul. 7, 1986, Ser. No. 883,752**
**Int. Cl.[4] B29C** *49/04, 47/02, 43/00*
**U.S. Cl. 264—515** **3 Claims**




1. A method of forming, in a mold having a pair of side sections movable toward and away from each other and a pair of generally co-planar end sections movable toward and away from each other and toward and away from said side sections, a plastic container having a generally cylindrical, hollow body with an integral, solid ring extending radially outward therefrom said method comprising the steps of:

(a) while said mold is in an open position, inserting molten plastic extrudate between said mold end and side sections in grooves formed by adjacent recesses of respective mold sections;

(b) extruding a plastic parison between said mold sections;

(c) closing said mold by moving said side sections toward each other and said end sections toward said side sections to close off the opposite ends of said parison and to compress extrudate between said mold end and side sections to form said ring;

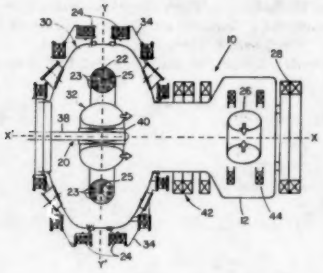
(d) introducing air under pressure into the interior of the parison in said mold to force the material of said parison against said mold sections to form said hollow container body and, at the same time, weld said ring to said body.

**4,713,208**

## SPHEROMAK REACTOR WITH POLOIDAL FLUX-AMPLIFYING TRANSFORMER

**Harold P. Furth, Princeton; Alan C. Janos, East Windsor, both of N.J.; Tsdao Uyama, Osaka, Japan, and Masaaki Yamada, Lawrenceville, N.J., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed May 21, 1986, Ser. No. 866,031**
**Int. Cl.[4] G21B *1/00***
**U.S. Cl. 376—137** **3 Claims**



1. Apparatus for forming and sustaining a spheromak plasma comprising:

a closed vacuum vessel having a longitudinal axis;

a generally circular conductive core disposed within said vacuum vessel symmetrically with respect to and along the longitudinal axis of said vacuum vessel, said conductive core having a plurality of electrical currents flowing therein for rapidly generating in an alternating manner first poloidal and toroidal magnetic fields, respectively, about said conductive core so as to form a spheromak plasma; and

an inductive transformer disposed radially inwardly of said conductive core and said spheromak plasma and spaced therefrom, said inductive transformer being coaxial with said longitudinal axis of said vacuum vessel, said inductive transformer having a current flowing therein for producing a second poloidal magnetic field about said conductive core, means for rapidly reversing said inductive transformer current and for converting said second poloidal magnetic field to a second toroidal magnetic field about said conductive core for facilitating the formation of and sustaining the spheromak plasma.

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**4,713,209**

## DRAIN RECOVERY SYSTEM FOR CONDENSATE FEEDWATER SYSTEM OF NUCLEAR POWER PLANT

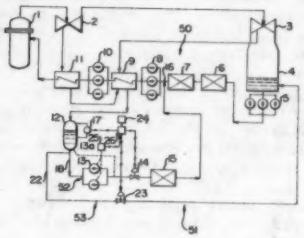
**Hitoshi Ishimaru, Hitachi, and Toshiki Kobayashi, Katsuta, both of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Engineering Co., Ltd., Ibaraki, both of, Japan**

**Filed Apr. 15, 1986, Ser. No. 852,315**
**Claims priority, application Japan, Apr. 15, 1985, 60-78369**
**Int. Cl.[4] G21C *7/32***
**U.S. Cl. 376—211** **10 Claims**

1. A drain recovery system for the condensate feedwater system of a nuclear power plant, said condensate feedwater system including condensate pumps for boosting the condensate from a condenser, and feedwater heaters for heating the condensate from said condensate pumps, said drain recovery system comprising:

drain pumping-up recovery means including a drain tank for storing a feedwater heater drain, and drain pump means connected to said drain tank for pumping up the drain therein to injet the drain into said condensate feedwater system at a predetermined portion thereof; and

drain level control means including conduit means connected between a portion of said drain pumping-up recovery means upstream of said drain pump means and a portion of said condensate feedwater system upstream of said condensate pumps for causing the drain in said drain tank



to be returned to said portion upstream of said condensate pumps by a pressure differential therebetween so as to maintain a drain level in said drain tank at a predetermined position when the plant operates at a low load level or said drain pump means malfunctions.

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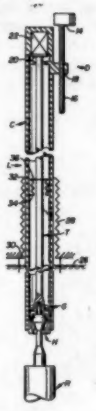
**4,713,210**

## CONTROL ROD DRIVELINE AND GRAPPLE

**John H. Germer, San Jose, Calif., assignor to General Electric Company, San Jose, Calif.**

**Filed Nov. 18, 1985, Ser. No. 798,778**
**Int. Cl.[4] G21C *7/12, 19/10***
**U.S. Cl. 376—233** **3 Claims**



1. A control rod driveline and grapple for engaging and releasing a control rod from a control rod drive, the combination comprising an enlarged control rod handle including an upwardly flaring frustum and a rod extending from said control rod handle;

a relatively moving outer member;

a tension rod connected to said relatively moving outer member at the upper end and provided with a lower annular flange at the lower end, said tension rod including a female cavity for receiving the upwardly extending rod from said enlarged control rod handle;

a plurality of discrete and independent grapple segments for surrounding and grappling the control rod handle, each grapple segment including a first indentation for engaging and gripping the flange of said tension rod at an upper and interior annulus;

said grapple segments defining collectively an enlarged

interior female annulus for confining said control rod handle and collectively defining at the lower extremity a gathering surface to permit said grapple segments to gather said handle upon downward movement;

said relatively moving outer member mounted about said tension rod, said second relatively outer member movable to a first position wherein said grapple segments can move to and from said open position and a second position wherein said grapple segments are restricted to a closed position;

said grapple segments including a first bearing surface on said lower annular flange on said tension rod and a second bearing surface on said control rod handle causing said grapple segments to close about said control rod handle when said tension rod is lowered overlying said control rod;

said grapple segments defining at the bottom peripheral surface adjacent said relatively moving outer member an exterior flange, said exterior flange when confronted to said outer member holding said segments in said closed position and when moving just beyond said relatively moving outer member permitting said segments to completely open whereby a small amount of relative movement between said relatively moving outer member and said tension rod causes release of said control rod;

and means for effective relative movement of said tension rod and said relatively moving outer member to permit said grapple segments to engage said control rod handle and permit said control to be manipulated by said drive.

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**4,713,211**

## HIGH TEMPERATURE PEBBLE BED REACTOR AND PROCESS FOR SHUT-DOWN

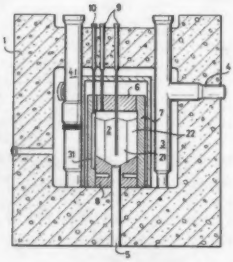
**Winfried Wachholz, Gorxheimer Tal, and Ulricht Weicht, Weinheim, both of Fed. Rep. of Germany, assignors to Hochtemperatur-Reaktorbau GmbH, Fed. Rep. of Germany**

**Filed Sep. 28, 1984, Ser. No. 655,420**

**Claims priority, application Fed. Rep. of Germany, Sep. 29, 1983, 3335269**

**Int. Cl.[4] G21C *7/08***

**U.S. Cl. 376—238** **5 Claims**



1. A process for the shutdown of a high temperature pebble-bed nuclear reactor having a core of spherical fuel elements, a reflector surrounding the core comprising a top reflector, a side reflector and a bottom reflector, means for the removal of decay heat, means for shutdown of the reactor over an extended period of time comprising at least one first absorber rod removably displaceable into the core of the reactor, and means for the rapid shutdown of the reactor comprising a plurality of second absorber rods removably displaceable into the side reflector of the reactor, the shutdown reactivity of said second absorber rods being such that the reactor may be reduced to a subcritical state under any condition by insertion of same into said side reflector, the process for shutdown of the reactor for all non-reactivity accidents comprising displacing only that portion of said second absorber rods into said side reflector which is sufficient to reduce the reactor to a subcritical state, the shutdown reactivity of said second absorber rods being such that only a portion of the total plurality of said absorber rods is required to achieve a subcritical state, removing decay heat to reduce the temperature of the reactor to a predetermined lower level and subsequently causing said reactor to become critical at said predetermined lower level.

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**4,713,212**

## PROCESS FOR SURVEILLANCE AND CONTROL OF OPERATIONS OF LOADING AND UNLOADING OF THE FUEL OF A NUCLEAR REACTOR AND APPARATUS APPLYING THIS PROCESS

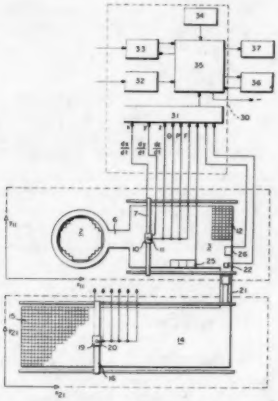
**Michel Plumier, Ham-Sur-Heure, Belgium, assignor to Ateliers de Constructions Electriques de Charleroi, Brussels, Belgium**

**Filed Sep. 5, 1984, Ser. No. 647,444**

**Claims priority, application European Pat. Off., Sep. 6, 1983, 83201278.5**

**Int. Cl.[4] G21C *19/02***

**U.S. Cl. 376—258** **8 Claims**



1. A process for the fully automated supervision and control of loading and unloading operations of groups of combustible nuclear elements into a core of a reactor, a reactor pool and a spent fuel pit by means of a reactor pool loading machine having a telescopic mast, upon the end of which is provided a gripping head with pinchers, for supplying the reactor and the reactor pool having a buffer rack, a fixed deposit station a transfer basket and a plurality of mobile deposit stations, and a deactivation pool handling machine having a telescopic mast, upon the extremity of which is provided a gripping head with pinchers for supplying the spent fuel storage pit containing storage racks and a transfer apparatus assuring the connection between the reactor pool and the spent fuel pit, comprising the steps of:

(a) recording a position of each group in the core of the reactor, the storage rack and the buffer rack,

(b) recording a position of the reactor pool loading machine, the deactivation pool handling machine, the transfer apparatus and the mobile deposit stations,

(c) verifying the identification of each group at the moment of gripping and/or at the moment of release of each group in the core of the reactor, in the buffer rack, in the transfer basket, in the storage rack, in the fixed deposit stations, and in the mobile deposit stations,

(d) supplying command and control signals for the manipulation of the reactor pool loading machine, the deactivation pool handling machine, the transfer apparatus and the mobile deposit stations;

(e) comparing the command signals and control signals of each manipulation ordered to the reactor pool loading machine, to the deactivation pool handling machine, to

the transfer apparatus, and to each mobile deposit station with recorded signals of a pre-established loading sequence and the position of each group, for producing a signal in one of:

(1) a first state indicating coincidence in said comparing step whereby said ordered manipulation can be safely carried out, and

(2) a second state indicating noncoincidence in said comparing step whereby said ordered manipulation cannot be safely carried out,

(f) carrying out one of (1) the manipulation of the reactor pool loading machine, the deactivation pool handling machine, the transfer apparatus and the mobile deposit station in response to said signal in said first state, and (2) a blocking of subsequent ordered manipulation by the reactor pool loading machine, by the deactivation pool handling machine, by the transfer apparatus or by any of the mobile deposit stations,

(g) updating the position of the group moved by the ordered manipulation; and

(h) establishing a table of final positions of each group in the core of the reactor, in the storage racks, and in the buffer rack for establishing a plan of disposition of the groups.

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**4,713,213**

## NUCLEAR REACTOR PLANT HOUSED IN A STEEL PRESSURE VESSEL WITH A GAS COOLED SMALL HIGH TEMPERATURE REACTOR

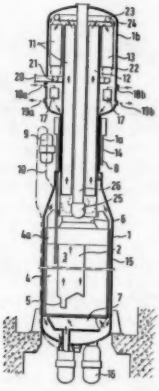
**Josef Schoening, Hambruecken, and Claus Elter, Bad Durkheim, both of Fed. Rep. of Germany, assignors to Hochtemperatur-Reaktorbau GmbH, Fed. Rep. of Germany**

**Filed Dec. 18, 1985, Ser. No. 811,111**

**Claims priority, application Fed. Rep. of Germany, Dec. 18, 1984, 3446101**

**Int. Cl.[4] G21C *15/18***

**U.S. Cl. 376—299** **19 Claims**



1. A nuclear reactor plant comprising a gas cooled small high temperature reactor, housed in a steel pressure vessel, the reactor having a core containing a pile of spherical fuel elements and traversed from bottom to top by a flow of primary helium gas,

a heat utilization system arranged in the flow of cooling gas and installed above the small high temperature reactor in the reactor pressure vessel and which is followed in line preferably by two circulating blowers connected in parallel;

the heat utilization system comprising a He/He heat exchanger in which the primary helium transfers its heat to secondary helium circulating in an intermediate circulation loop;

the He/He heat exchanger comprises an inner annular coil bundle, extending to a hot gas collector chamber located above the reactor core and exposed from below to hot primary helium cooling gas and an outer coil bundle arranged concentrically and connected successively where the inner coil bundle is of greater length than the outer coil bundle and only the inner coil bundle extends to the hot gas collector chamber;

at least one decay heat exchanger installed in the steel pressure vessel;

the decay heat exchanger is arranged immediately following the He/He heat exchanger in the direction of flow, and is constantly traversed by the entire flow of cooling gas.

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**4,713,214**

## DEVICE FOR PURIFYING LIQUID METAL COOLANT FOR A FAST NEUTRON NUCLEAR REACTOR

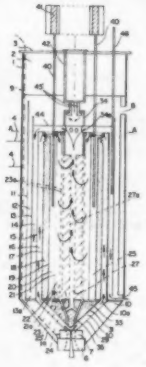
**Jean-Jacques Dumay, Dampierre, and Claude Malaval, Antony, both of France, assignors to Novatome, Le Plessis Robinson, France**

**Filed Oct. 13, 1983, Ser. No. 541,749**

**Claims priority, application France, Oct. 29, 1982, 82 18195**

**Int. Cl.[4] G21C *19/30***

**U.S. Cl. 376—312** **13 Claims**



1. In a fast neutron nuclear reactor cooled by a liquid metal and comprising a vessel containing said liquid metal coolant and a support structure, a device of purifying the liquid metal coolant comprising

(a) an external cylindrical envelope fixed to the support structure;

(b) an assembly of annular and coaxial chambers separated by cylindrical casings disposed vertically inside said cylindrical envelope;

(c) a pump connected to said assembly of chambers and disposed with respect to said vessel for circulating the liquid metal through said chambers;

(d) a filter cartridge disposed at the central part of said assembly of chambers;

(e) a channel disposed at the central part of said filter cartridge for collecting the purified liquid metal;

(f) an economizer exchanger contained in a first chamber of said assembly of chambers connected to said pump to receive liquid metal to be purified and to said channel to receive purified liquid metal;

(g) cooling means connected to a second chamber for cooling the liquid metal before its purification by passage through the filter wherein said chambers are all disposed one inside the other, their casings being fixed at their lower parts, on one horizontal plate supported by said external envelope, such that they are freely expandable independent of each other, said assembly of chambers comprising from said external envelope inwards;

a chamber for degassing the purified metal open in its upper part, bounding externally by its external wall a basin for

collecting the purified metal placed at the upper part of the device;

said first chamber enclosing the economizer exchanger communicating with the lower part of said degassing chamber through its part receiving the purified liquid metal and with a duct for discharging the purified liquid metal;

said second chamber connected to said cooling means and filled with purified liquid metal;

a chamber containing the filter in communication through its upper part with the part of the economizer exchanger where circulates the liquid metal to be purified; and

said channel for collecting the purified liquid metal;

an annular thermal insulation wall coaxial with the chambers being disposed between said first and said second chambers.

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**4,713,215**

**PROCESS FOR SINTERING POWDERED MATERIAL IN A CONTINUOUS FURNACE**

**Michel Madsac, Sceaux, France, assignor to L'Air Liquide, Paris, France**

**Filed May 15, 1987, Ser. No. 49,850**

**Claims priority, application France, May 16, 1986, 86 07067**

**Int. Cl.[4] B22F 7/00**

**U.S. Cl. 419—8** **5 Claims**

1. A process for sintering in a continuous furnace a powdered material containing oxygen in the oxide and/or adsorbed state, comprising reducing the oxygen present in a first pre-sintering stage and then ensuring a cohesion of the material in second sintering stage, said pre-sintering stage being carried out under a reducing atmosphere based on hydrogen and neutral gas having a flow rate $F_G$ which is at least equal to:

$$F_G \geq \frac{1.4 \times S_P \times D_P}{P(H_2)i - P(H_2)f} \times \frac{X(O_2)i}{\alpha} \times v_S$$

$S_P$=section of a layer of said powdered material to be sintered in sq.m

$D_P$=voluminal mass of said powdered material in kg/cu.m

$X(O_2)i$=percentage of oxygen mass in said powdered material before said pre-sintering stage in the oxide and/or adsorbed form,

$P(H_2)i$=voluminal percentage of hydrogen in the gas introduced into the furnace,

$P(H_2)f$=the smallest voluminal percentage of hydrogen in the atmosphere in the furnace at a point where the oxides have been completely reduced,

$v_S$=speed of feed of the material in the furnace expressed in m/hr,

$\alpha$ is a constant

$F_G$ being expressed in cu.m/hr

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**4,713,216**

**ALUMINUM ALLOYS HAVING HIGH STRENGTH AND RESISTANCE TO STRESS AND CORROSION**

**Kenji Higashi; Tadakazu Ohnishi, and Ichizo Tsukuda, all of Osaka, Japan, assignors to Showa Aluminum Kabushiki Kaisha, Osaka, Japan**

**Filed Apr. 22, 1986, Ser. No. 854,777**

**Claims priority, application Japan, Apr. 27, 1985, 60-91840; Aug. 22, 1985, 60-185472; Mar. 7, 1986, 61-51078**

**Int. Cl.[4] C22C 21/10**

**U.S. Cl. 420—532** **14 Claims**

1. An aluminum alloy having excellent properties including high resistance to stress and corrosion, the alloy consisting essentially of 4.0 to 12% of zinc, 0.3 to 5.0% of magnesium, and one or more elements selected from the rare earth elements, wherein the content of the selected element is in the range of 0.5 to 10.0%, and the balance being substantially aluminum and unavoidable impurities.

2. An aluminum alloy as defined in claim 1, further containing 0.05 to 2.0% of copper.

**4,713,217**

**NICKEL BASE BRAZING ALLOY AND METHOD**

**Marvin J. Stern, Seattle, Wash., assignor to Alloy Metals, Inc., Troy, Mich.**

**Filed Jun. 4, 1984, Ser. No. 617,287**

**Int. Cl.[4] C22C 19/05**

**U.S. Cl. 420—452** **7 Claims**

1. A nickel base brazing alloy suitable for diffusion brazing nickel base superalloys consisting essentially of the following composition in weight percent:

Chromium: 12 to 14%

Boron: 1 to 2.5%

Iron: 3 to 4.5%

Nickel: Balance

the brazing alloy having less than about 0.03% carbon and less than 0.04% incidental impurities and additions.

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**4,713,218**

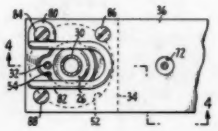
**TUBE TRAP APPARATUS**

**Henry L. Schwartz, Los Gatos, Calif., assignor to Sequoia-Turner Corporation, Mountain View, Calif.**

**Filed Jul. 22, 1985, Ser. No. 757,646**

**Int. Cl.[4] G01N 37/00**

**U.S. Cl. 422—99** **9 Claims**




1. An apparatus for registering tubes with an elongate probe which comprises:

an elongate probe selectively movable along a shaft between retracted and extended positions;

spring means having at least one aperture therethrough for receiving said elongate probe:

restraint means affixed to said spring means, said restraint means having an aperture therethrough which is aligned with said spring means aperture, for receiving said elongate probe, said spring means selectively biasing said restraint means against a tube top to focus a tube mouth in line with said elongate probe prior to insertion of said elongate probe into the tube mouth; and

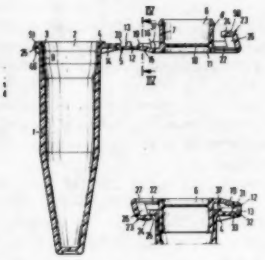
bail means, affixed to said spring means for receiving said elongate probe therethrough,

wherein said elongate probe passes through said spring means aperture and said restraint means aperture and wherein said elongate probe mechanically contacts said bail means to selectively retract and to extend said restraining means relative to the tube top in sequence with said elongate probe shaft extension and retraction.

## 4,713,219
## PLASTIC REACTION VESSEL

**Hero Gerken, and Heinz-Jürgen Gora, both of Hamburg, Fed. Rep. of Germany, assignors to Eppendorf Geratebau Netheler & Hinz GmbH, Hamburg, Fed. Rep. of Germany**

**Continuation of Ser. No. 686,198, Dec. 26, 1984, abandoned. This application Oct. 20, 1986, Ser. No. 921,866**
**Claims priority, application Fed. Rep. of Germany, Jan. 24, 1984, 3402276**
**Int. Cl.[4] B01L** *3/00*
**U.S. Cl. 422—102** **12 Claims**

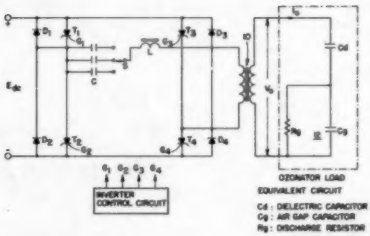


1. In a plastic reaction vessel comprising
a hollow vessel body having an inside peripheral surface and an edge portion which defines an opeing (2) adjoining said surface,
a cover comprising a cylindrical skirt which extends through said opening into said vesssel body and is removable therefrom and has an inner end provided with a sealing lip (8) in sealing contact with said inside peripheral surface, said cover having a radially outwardly protruding rim which is axially spaced from said sealing lip and contacts said edge portion along a substantial part of the peripheral extent of the edge portion, said cover also comprising a transverse wall, said wall axially spaced from said sealing lip and closing said skirt, and
a flexible connecting strip (5) having opposite ends that are respectively integral with said vessel body and said cover, said connecting strip permitting said skirt to be removed from said vessel through said opening,
the improvement comprising that
said vessel body comprises a body flange (4) which surrounds said edge portion, said flange defining a downwardly facing abutment surface (25, 41) extending radially outwardly from said vessel body at a location which is diametrically opposite to said connecting strip,
said cover comprises a hooklike extension (23) which is attached to said body flange and spaced radially outwardly from said skirt and releasably engages said abutment surface,
said connecting strip comprises a hinge portion (12) defining between said opposite ends at least one laterally extending hinge axis,
said cover comprises a depending flange extending downwardly from the outer edge of said rim and contacting the periphery of said body flange, wherein
said hinge portion of said connecting strip comprises two hinges (31, 32) spaced apart along said strip, so that in conjunction with said depending flange said hinge portion permits a lateral movement of said cover whereas a parallel guidance of said cover is effected by said depending flange in contact with said body flange,
said hinges spaced such a distance apart that said parallel guidance is provided in a height which corresponds to the length of said hooklike extension, and
an alignment of the cover is effected by the contact of said sealing lip with said inside surface, and wherein
said hinge portion (12) is provided with an inwardly protruding projection (13) attached to said hinge portion (12) of said connecting strip and located between said hinges, said projection (13) serving for holding said hinges (31, 32) spaced apart and for effecting a parallel guidance by means of said hinges, and wherein
said hinge portion (12) is thinner between said hinges than those portions (14, 15) of said connecting strip which extend from said hinge portion to said vessel body (1) and said cover (6), respectively, and
an upwardly protruding step (33) facing away from said vessel body is formed in said portion which extends from said hinge portion to said vessel body.

## 4,713,220
## OZONATOR POWER SUPPLY

**Anh N. Huynh, Edgewood, Ky., and Phoivos D. Ziogas, Brossard, Canada, assignors to National Distillers and Chemical Corporation, New York, N.Y.**

**Continuation of Ser. No. 725,737, Apr. 22, 1985, Pat. No. 4,680,694. This application Feb. 13, 1987, Ser. No. 14,750**
**Int. Cl.[4] B01J** *19/08*
**U.S. Cl. 422—186.16** **18 Claims**


INVERTER CONTROL CIRCUIT
OZONATOR LOAD EQUIVALENT CIRCUIT
Cd : DIELECTRIC CAPACITOR
Cg : AIR GAP CAPACITOR
Rg : DISCHARGE RESISTOR

1. A power supply circuit for an ozonator comprising:
a. a DC/AC thyristor bridge inverter coupled at its input terminals to a direct current power source and at its output terminals to a resonant network, said thyristor bridge inverter comprising a first thyristor means for conducting through the resonant network in a first direction and a second thyristor means for conducting through the resonant network in a second direction;
b. said resonant network having a step up high voltage transformer with its primary winding coupled to said thyristor bridge inverter and its secondary winding coupled to the ozonator; and
c. an inverter control circuit for controlling the gating electrodes of said first and second thyristor means, said inverter control circuit comprising a square wave generator for generating first and second opposite square wave signals, a first edge detecting circuit coupled to the first square wave signal for producing a first gating pulse for each detected edge, which is coupled to gate said first thyristor means, and a second edge detecting circuit coupled to the second square wave signal for producing a second gating pulse for each detected edge, which is coupled to gate said second thyristor means.

## 4,713,221
## CRUDE OIL REFINING APPARATUS

**Dean P. Montgomery; James W. Gall, both of Bartlesville, Okla., and Ed D. Davis, Borger, Tex., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 613,944, May 25, 1984, Pat. No. 4,565,620. This application Sep. 16, 1985, Ser. No. 776,280**
**Int. Cl.[4] B01J** *8/04;* **C10G** *69/14*
**U.S. Cl. 422—190** **4 Claims**

1. Apparatus comprising:
a crude tower;
means for providing a crude oil feed to said crude tower,

wherein said crude oil feed is at least partially separated into fractions in said crude tower;

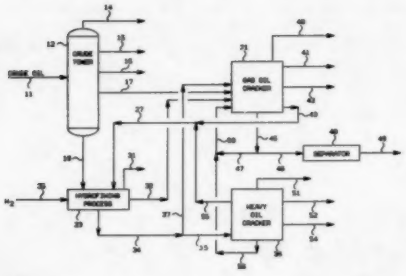
a first catalytic cracking unit for catalytically cracking gas oil;

means for withdrawing a first gas oil fraction from said crude tower and for providing said first gas oil fraction as a feed to said first catalytic cracking unit, wherein said first gas oil fraction is at least partially cracked in said first catalytic cracking unit to produce lighter products and a second heavy cycle oil fraction;

a hydrofining unit;

means for withdrawing a topped crude fraction from the bottom portion of said crude tower and for providing the topped crude fraction as a feed to said hydrofining unit;

a second catalytic cracking unit for catalytically cracking heavy oil;



means for withdrawing the heaviest fraction from said hydrofining unit and for providing at least a portion of said heaviest fraction as a feed to said second catalytic cracking unit, wherein said heaviest fraction is at least partially cracked in said second catalytic cracking unit to produce lighter products and a first heavy cycle oil fraction; and

means for withdrawing said first heavy cycle oil fraction from said second catalytic cracking unit and for providing said first heavy cycle oil fraction as a feed to said hydrofining unit; and

means for withdrawing said second heavy cycle oil fraction from said first catalytic cracking unit and for providing said second heavy cycle oil fraction as a feed to said hydrofining unit.

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**4,713,222**

## IRON REMOVAL FROM BAYER PROCESS LIQUOR

**David O. Owen, Aurora, and Lawrence J. Connelly, Oak Lawn, both of Ill., assignors to Nalco Chemical Company, Naperville, Ill.**

**Filed Jul. 28, 1986, Ser. No. 890,206**

**Int. Cl.[4] C01G *49/00***

**U.S. Cl. 423—122** **6 Claims**

1. A method for removing iron compounds from Bayer process liquors prior to alumina removal which comprises the steps of treating said Bayer process liquors with at least 10 ppm of a water-soluble ferrous salt to form an iron containing precipitate and then flocculating said precipitate with a polymeric flocculating agent.

**4,713,223**

## METHOD OF PROCESSING AN IRON-CONTAINING DUST OBTAINED IN THE PREPARATION OF IRON OR STEEL

**Carel W. Hooykaas, Rotterdam, Netherlands, assignor to Pelt & Hooykaas B.V., Rotterdam, Netherlands**

**Continuation of Ser. No. 741,008, Jun. 4, 1985, abandoned. This application Aug. 1, 1986, Ser. No. 891,416**

**Claims priority, application Netherlands, Jun. 5, 1984, 8401796**

**Int. Cl.[4] C01G *49/02***

**U.S. Cl. 423—140** **13 Claims**

1. A method of recovering iron from a waste material generated during the processing of iron or steel, said waste material containing predominantly iron together with bivalent materials selected from the group consisting of zinc, lead and cadmium, said method comprising the steps of

(1) contacting the waste material with an aqueous hydrochloric acid solution so as to dissolve at least all the iron from the waste material in the acid medium, thus providing an iron-rich solution,

(2) adding a complexing agent selected from the group consisting of thioethers in hydrochloric acid solution, liquid bis(2-ethylhexyl)phosphate in an acid medium, cyclohexanone oxim/oleic acid in hexane, and polyamines to said iron-rich solution so as to form a soluble complex with any of said bivalent metals which have dissolved in said iron-rich solution,

(3) adding an ammonia solution to said iron-rich solution to adjust its pH to between 5 and 8, thus causing iron to precipitate from said iron-rich solution as iron (III) hydroxide, leaving a complex-containing solution,

(4) recovering said precipitated (III) hydroxide, and

(5) recovering said complexing agent from said complex-containing solution, thus leaving a resultant solution containing said bivalent metals.

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**4,713,224**

## ONE-STEP PROCESS FOR PURIFYING AN INERT GAS

**Satish Tamhankar, Scotch Plains, and William R. Weltmer, Murray Hill, both of N.J., assignors to The BOC Group, Inc., Montvale, N.J.**

**Filed Mar. 31, 1986, Ser. No. 846,184**

**Int. Cl.[4] C01B *13/00, 1/26, 17/16;* B01J *8/00***

**U.S. Cl. 423—219** **19 Claims**

1. A novel single-stage process for purifying an inert gas feed stream containing not greater than 1000 ppmv of impurities selected from the group consisting of carbon monoxide, carbon dioxide, oxygen, hydrogen, water vapor and mixtures thereof, consisting essentially of passing said inert gas stream comprising at least carbon monoxide, carbon dioxide and oxygen through a bed of particulate material comprised of nickel in an amount of at least about 5% by weight as elemental nickel at a temperature of from 0° to 50° C. and withdrawing a purified inert gas containing less than about several parts per million of said impurity.

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**4,713,225**

## METHOD FOR REMOVING ORGANIC REDUCED SULFUR COMPOUNDS

**Joseph Iannicelli, Jekyll Island, Ga., assignor to Aquafine Corporation, Brunswick, Ga.**

**Continuation-in-part of Ser. No. 574,285, Feb. 26, 1984, abandoned. This application Aug. 12, 1985, Ser. No. 764,740**

**The portion of the term of this patent subsequent to Nov. 12, 2002, has been disclaimed.**

**Int. Cl.[4] C01B *17/16, 31/20, 17/00;* B01J *8/00***

**U.S. Cl. 423—230** **5 Claims**

1. A method for removing organic reduced sulfur-containing compounds from an air stream comprising:

(a) providing a foraminous filter useful for removing particulates from a gas being flowed therethrough having im-

pregnated therein manganese dioxide, said manganese dioxide obtained by oxidizing in-situ precipitated manganese (II) hydroxide, said manganese dioxide being active for removal of said organic reduced sulfur-containing compounds, and

(b) forming an air stream containing said organic reduced sulfur-containing compounds through said filter to remove said organic reduced sulfur-containing compounds from said air stream.

2. A method for removing organic reduced sulfur-containing compounds from an air stream comprising:

(a) providing a foraminous filter useful for removing particulates from a gas being flowed therethrough having impregnated therein manganese dioxide, said manganese dioxide obtained by oxidizing in-situ precipitated manganese (II) hydroxide, prepared by reacting manganese (II) ions with ammonia, said manganese dioxide being active for removal of said organic reduced sulfur-containing compounds, and

(b) flowing an air stream containing said organic reduced sulfur-containing compounds through said filter to remove said organic reduced sulfur-containing compounds from said air stream.

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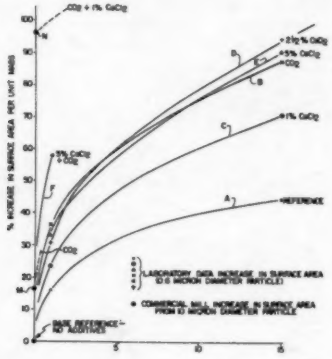
## 4,713,226
## PROCESS FOR PRODUCING FINELY DIVIDED LIMESTONE FOR SULFUR OXIDE REMOVAL

**Preston L. Veltman, Severna Park, Md., assignor to A/S Niro Atomizer, Soeborg, Denmark**

**Division of Ser. No. 548,126, Nov. 2, 1983, Pat. No. 4,629,130. This application Sep. 8, 1986, Ser. No. 904,425**

**Int. Cl.[4] C01B** *17/00;* **B01J** *8/00*

**U.S. Cl. 423—242** **10 Claims**


% INCREASE IN SURFACE AREA PER UNIT MASS
REFERENCE
LABORATORY DATA INCREASE IN SURFACE AREA 0.5 MICRON DIAMETER PARTICLE
COMMERCIAL MILL INCREASE IN SURFACE AREA FROM 10 MICRON DIAMETER PARTICLE
RAW REFERENCE NO ADDITIVES

1. A dry flue gas desulfurization process comprising:

(a) dispersing an aqueous media containing finely divided calcium carbonate particulates having a weight average diameter of 10 microns or less in a gas stream containing sulfur oxides;

(b) passing the gas stream containing the calcium carbonate particulates to a particle separation zone; and

(c) recovering the calcium carbonate particulates from the gas stream substantially free of sulfur oxides; said aqueous media containing finely divided calcium carbonate particulates being produced by a process comprising the steps of:

(i) forming a slurry of calcium carbonate in an aqueous media;

(ii) adding carbon dioxide from an external source to said slurry; and

(iii) abrasively grinding the calcium carbonate in said slurry in the presence of said carbon dioxide to produce said finely divided calcium carbonate particulates.

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## 4,713,227
## METHOD FOR THE SYNTHESIS OF METALLOPHOSPHOALUMINATES

**Eric G. Derouane, Namur, Belgium, and Roland V. Ballmoos, Hopewell, N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 804,326, Dec. 4, 1985, abandoned, which is a continuation of Ser. No. 615,391, May 30, 1984, abandoned. This application Jun. 25, 1986, Ser. No. 878,145**

**The portion of the term of this patent subsequent to Jun. 16, 2004, has been disclaimed.**

**Int. Cl.[4] C01B** *25/45*

**U.S. Cl. 423—305** **13 Claims**

1. A method for synthesis of crystalline metallophosphoaluminate characterized by a composition, in the anhydrous state, as follows:

$$A_v Q_f (AlO_2^-)_{1-x} (PO_2^+)_{1-y} (MO_2^{m-4})_{x+y} T_j$$

wherein A is occluded organic solvent and directing agent, v is the number of moles A, Q is an alkali metal cation, T is a monovalent anion, and M is one or more elements other than aluminum or phosphorus of valence m, and x, y, i and j are numbers which satisfy the relationship:

$$i-j=y-x+(4-m)\cdot(x+y),$$

said metallophosphoaluminate having an ion exchange capacity of at least about 0.002 meq/g, which comprises:

providing a reaction mixture comprising components in the following relationship:

$$(D)_a (Q_2O)_b (Al_2O_3)_c (P_2O_5)_d (MO_{m/2})_e (So)_f (T)_g (H_2O)_h$$

wherein D is an organic directing agent, So is a substantially water-immiscible organic solvent and a, b, c, d, e, f, g, and h are numbers satisfying the following relationships:

a/(c+d+e) is greater than 0 but less than 4,

b/(c+d+e) is less than 2,

e/(c+d) is greater than 0 but less than 2,

f/(c+d+e) is from 0.1 to 15,

g/(c+d+e) is less than 2, and

h/(c+d+e) is from 3 to 150,

wherein upon initial provision of said reaction mixture the source of one of the M, Al or P oxides is dispersed or dissolved in the substantially water-immiscible organic solvent;

heating said reaction mixture at a rate of from about 5° C. to about 200° C. per hour to a temperature of from about 80° C. to about 300° C.;

maintaining said reaction mixture at a temperature of from about 80° C. to about 300° C. and a pH of from about 2 to about 9; and

recovering said metallophosphoaluminate.

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## 4,713,228
## HEAT RECOVERY IN THE MANUFACTURE OF PHOSPHORUS ACIDS

**Jonathan F. Shute, Lawrence, Kans., and Harvey Rosenhouse, East Windsor, N.J., assignors to FMC Corporation, Philadelphia, Pa.**

**Continuation of Ser. No. 497,442, May 23, 1983, abandoned. This application Nov. 4, 1986, Ser. No. 926,490**

**Int. Cl.[4] C01B** *25/12*

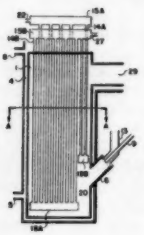
**U.S. Cl. 423—317** **6 Claims**

1. A process of producing phosphoric acid with heat recovery comprising:

(a) burning phosphorus and air in a combustion zone to form a gas stream containing $P_2O_5$ vapors;

(b) providing a heat exchange means in said combustion zone in proximity to the burning phosphorus;

(c) passing a heat exchange fluid through said heat exchange means to maintain the outer surface thereof at a temperature no higher than about 1000° F. (538° C.), said surface



having thereon a protective, adherent coating of metaphosphoric acid;

(d) removing heat from the gas stream, without cooling the gas stream below its dew point; and

(e) conveying the gas stream of $P_2O_5$ containing vapors to a conversion zone for recovery of phosphoric acid.

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**4,713,229**

**PROCESS FOR PURIFYING PHOSPHORIC ACID**

**Günther Schimmel, and Reinhard Gradl, both of Erftstadt, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Sep. 9, 1985, Ser. No. 774,084**

**Claims priority, application Fed. Rep. of Germany, Sep. 21, 1984, 3434611**

**Int. Cl.⁴ C01B *25/14, 25/16***

**U.S. Cl. 423—321 R** **9 Claims**

1. In a process for purifying phosphoric acid containing from 3 to 80 weight % $P_2O_5$, especially for removing ions of cadium, copper, mercury, lead and arsenic and optionally also organic compounds and sulfuric acid from wet process phosphoric acid, wherein the phosphoric acid is contacted either with a diorganyldithiophosphoric acid ester or with a mixture of an adsorbent and said ester or, prior to or after said treatment with the ester, is contacted with the adsorbent alone and the phase containing the purified phosphoric acid is separated from the phase containing the ester, the improvement which comprises: admixing the phosphoric acid with a reductant prior to treating it with the dithiophosphoric acid ester and, in the event of an adsorbent being used, using the adsorbent alone or in combination with an alkaline earth metal compound soluble in phosphoric acid, whereby cadmium, arsenic and copper contaminants are effectively removed.

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**4,713,230**

**PURIFICATION OF CHLOROSILANES**

**Richard S. Doornbos, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.**

**Continuation of Ser. No. 427,082, Sep. 29, 1982, abandoned. This application Aug. 13, 1984, Ser. No. 640,226**

**Int. Cl.⁴ C01B *33/08, 33/107***

**U.S. Cl. 423—341** **20 Claims**

1. A process for purification of a chlorosilane selected from the group consisting of monochlorosilane, dichlorosilane, trichlorosilane, and tetrachlorosilane where said chlorosilane is contaminated with boron-containing impurities, said process comprising the steps of

(A) passing the chlorosilane, in the vapor phase, through a bed of silica, said bed of silica consisting of silica containing about 0 to 10% by weight free water and more than about about 0.25% by weight total hydroxyl, said bed of silica being at a temperature greater than 3° C. above the boiling point of the chlorosilane at the operating pressure of step (A) and a temperature of less than or equal to about 99° C., and

(B) collecting the purified chlorosilane having a significantly reduced amount of the boron-containing impurities.

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**4,713,231**

**PROCESS FOR THE RECOVERY OF AMMONIA AND FLUORIDE VALUES FROM AMMONIUM FLUORIDE SOLUTIONS**

**Kent D. Campbell, Concord; Laura J. Dietsche, Berkeley; Lee B. Crampton, Concord; Keith D. Hovda, Antioch; George K. Tyson, Walnut Creek, and Charles A. Wilson, Pittsburg, all of Calif., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Jul. 21, 1986, Ser. No. 887,587**

**Int. Cl.⁴ C01B *7/19***

**U.S. Cl. 423—356** **20 Claims**

12. A process for preparing a slurry comprising potassium fluoride in a water soluble, dipolar, aprotic solvent which process comprises combining an aqueous solution comprising potassium fluoride with the solvent and distilling to remove water.

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**4,713,232**

**PROCESS FOR THE DESTRUCTION OF BY-PRODUCT TETRANITROMETHANE**

**Chang-Hwa Chin, Brossard; Anthony C. F. Edmonds, North York, and Colin M. Evans, Toronto, all of Canada, assignors to C-I-L Inc., North York, Canada**

**Filed Aug. 13, 1986, Ser. No. 896,094**

**Claims priority, application Canada, Apr. 9, 1986, 506238**

**Int. Cl.⁴ C01B *21/46, 21/38***

**U.S. Cl. 423—390** **7 Claims**

1. A process for the destruction of tetranitromethane which is present in admixture with nitric acid as a by-product of the nitric acid treatment of an organic substance, which destruction process comprises subjecting the tetranitromethane and nitric acid mixture to a temperature of at least 210° C. whereby the tetranitromethane fraction is decomposed and the nitric acid fraction is substantially preserved for recovery.

4,713,233

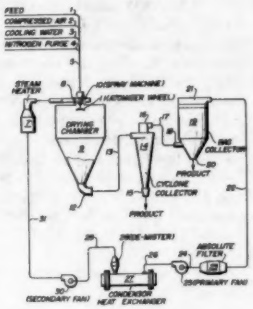
## SPRAY-DRIED INORGANIC OXIDES FROM NON-AQUEOUS GELS OR SOLUTIONS

Gary B. Marsh, Pittstown; Anthony J. Fanelli, Rockaway; John N. Armor, Morris Plains, and Patrick M. Zambri, Montclair, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Continuation of Ser. No. 717,931, Mar. 29, 1985, Pat. No. 4,649,037. This application Sep. 24, 1986, Ser. No. 910,929

Int. Cl.[4] C01G *25/02*

U.S. Cl. 423—608 1 Claim




1. A yttria-stabilized zirconia xerogel having a pore volume of at least 1.4 cc/g and a surface area of at least 219 $m^2/g$.

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4,713,234

## PROCESS AND APPARATUS FOR CONVERSION OF WATER VAPOR WITH COAL OR HYDROCARBON INTO A PRODUCT GAS

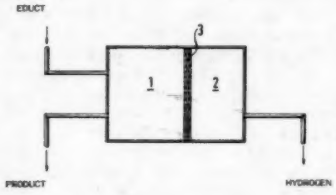
Walter Weirich, Aachen; Heiko Barnert, Jülich; Michael Oertel, Aachen, and Rudolf Schulten, Aachen-Richterich, all of Fed. Rep. of Germany, assignors to Kernforschungsanlage Jülich Gesellschaft mit beschränkter Haftung, Jülich, Fed. Rep. of Germany

Filed Jul. 1, 1985, Ser. No. 750,909

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1984, 3424208

Int. Cl.[4] C01B *1/02*

U.S. Cl. 423—648 R 17 Claims




1. In a process of generating a product gas containing hydrogen, by reacting under heat a mixture of steam and solid carbon in a reaction vessel, a method of improving the reaction in order to separate and isolate the hydrogen from the product gas comprising the steps of:

forming a hydrogen collection chamber in said vessel by providing a hydrogen-permeable membrane;

introducing solid carbon into said reaction vessel;

introducing steam into said reaction vessel;

reacting said solid carbon and said steam in said reaction vessel;

providing external heat to support said reaction within the reaction vessel;

reducing hydrogen adsorption by said solid carbon at its surface by continuously removing and collecting the generated hydrogen into said collection chamber within said reaction vessel; and

maintaining a hydrogen pressure differential across said membrance to augment hydrogen flow into said hydrogen collection chamber and hydrogen removal from said vessel.

4. Apparatus for generating a product gas containing hydrogen, by reacting under external heat a mixture of steam and solid carbon in a reaction vessel and separating and isolating the hydrogen from the product gas, comprising:

a reaction vessel having inlets for receiving steam and solid carbon, such as coal or coke, and at least one outlet for product gas;

a reaction zone for reacting said solid carbon and said steam in said vessel;

a hydrogen collection chamber in said vessel, said collection chamber being formed from a wall which is selectively hydrogen permeable for separating the hydrogen from the product gas and which hydrogen collection chamber is located away from said reaction zone in said reaction vessel, and wherein said collection chamber is connected to hydrogen collecting means for continuously collecting and removing hydrogen;

means to maintain a hydrogen pressure differential across said wall to facilitate hydrogen permeation from said reaction vessel into said hydrogen collection chamber; and means for maintaining a reaction temperature inside said reaction vessel of between about 500° to 1000° C.;

said hydrogen permeable wall providing means for reducing hydrogen adsorption by said solid carbon at its surface by continuously removing and collecting the generated hydrogen in said reaction chamber.

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4,713,235

## RADIOPAQUE CYANOACRYLATES

Robert E. Krall, Raleigh, N.C., assignor to CRX Medical, Inc., Raleigh, N.C.

Continuation-in-part of Ser. No. 267,400, May 26, 1981, abandoned, which is a continuation-in-part of Ser. No. 198,466, Oct. 20, 1980, abandoned. This application Dec. 16, 1982, Ser. No. 450,249

Int. Cl.[4] A61K *49/04*

U.S. Cl. 424—5 15 Claims

1. A radiopaque polymerization cyanoacrylate composition comprising a mixture of an ester of 2-cyanoacrylic acid and a radiopaque additive stable to and not substantially decreasing the storage life of the cyanoacrylate ester, the additive including at least one member selected from the group consisting of triiodophenol, iodoform and tetraiodoethylene and the composition having between 0.5 and 11 mole percent iodine atoms.

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4,713,236

## POLYMERIC AMINE CONDITIONING ADDITIVES FOR HAIR CARE PRODUCTS

M. Fred Hoover, and Lawrence J. Guilbault, both of Topsfield, Mass., assignors to Morton Thiokol, Inc., Chicago, Ill.

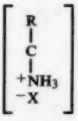
Filed Dec. 7, 1981, Ser. No. 327,670

Int. Cl.[4] A61K *7/06*; C08F *124/00*

U.S. Cl. 424—70 12 Claims

1. A hair conditioning product which is a member selected from the group consisting of shampoos, conditioners, creme rinses, and setting gels and containing an effective amount of a polymer for imparting good conditioning properties to hair made from ethylenically unsaturated addition polymerizable monomers and containing units of a member selected from the group consisting of a pendant primary amino group of the following structure:

where:
=an organic polymer chain;
R=H, alkyl, aryl, —COOH, —COOR″ or —$CONH_2$, and
R″—methyl, ethyl or other lower alkyl; an ammonium salt of said amine group of the following structure:



where:
=an organic polymer chain,
R=H, alkyl, aryl, —COOH, —COOR″ or —$CONH_2$, and
R″=methyl, ethyl or other lower alkyl, and
$^-$X=halide, hydroxide, methyl sulfate, or similar negatively charged group;
or admixtures of the amino group and salt.

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**4,713,237**

## SUSTAINED RELEASE DOSAGE FORM

**Mahendra Shah, Lake Hiawatha, N.J., assignor to Schering Corporation, Kenilworth, N.J.**

**Filed Jun. 18, 1984, Ser. No. 621,580**
**Int. Cl.[4] A61K** *9/22, 9/52, 31/74, 31/78*
**U.S. Cl. 424—78** **3 Claims**

1. A sustained release dosage form comprising an effective amount of active ingredient and an effective amount of a water insoluble, water swellable, saponified starch acrylonitrile graft copolymer to provide sustained release of said active upon oral administration to a patient in need of such treatment.

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**4,713,238**

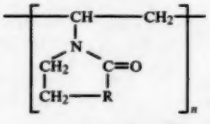
## WATER SOLUBLE COMPLEX OF A POLY (VINYL LACTAM) AND CHLOROTHIAZIDE AND PROCESS FOR PRODUCING SAME

**Eugene S. Barabas, Watchung, N.J., assignor to GAF Corporation, Wayne, N.J.**

**Filed May 2, 1986, Ser. No. 858,635**
**Int. Cl.[4] A61K** *31/38;* **C07D** *285/28*
**U.S. Cl. 424—80** **12 Claims**

1. Water soluble chlorothiazide in a complexed state, derived from the reaction between a polymer of a N-vinyl lactam having 6 to 7 carbon atoms and chlorothiazide.

8. The process for producing the complexed compound of claim 1 which comprises: mixing alkali metal hydroxide solutions of chlorothiazide and a poly(N-vinyl lactam) having the formula:



wherein n is an integer having a value of from 5 to 3,500 and R is —$CH_2$— or —$C_2H_4$— in a mole ratio of polymer to chlorothiazide of between about 1:1 and about 10:1, agitating the mixture having a pH of between about 7.5 and about 10 under a pressure of from about atmospheric to about 50 psig at a temperature of from about 4° C. to about 100° C. and below the boiling point of said hydroxide solution, for a period of from about 5 minutes to about 3 hours, to form the alkali metal salt of the complexed poly(N-vinyl lactam) and chlorothiazide in the liquid phase, separating said hydroxide solution from said complexed salt, diluting said complexed salt with water and adjusting the pH of the resulting solution to between about 3.5 and about 7 to produce the complexed poly(N-vinyl lactam)-chlorothiazide product of the reaction.

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**4,713,239**

## ANTIANGINAL FILM AND METHOD OF TREATING ISCHEMIC HEART DISEASE

**Eduard A. Babaian; Galina A. Gerasimova; Anatoly B. Davydov; Rustam I. Utyamyshev; Gennady L. Khromov; Vladimir I. Metelitsa; Anatoly M. Vikhert; Konstantin L. Savvateev; Vladimir K. Piotrovsky, and Elizaveta B. Novikova, all of Moscow, U.S.S.R., assignors to Vsesojuny Kardiologichesky Nauchny Tsentr Adkaemii Meditsinski Nauk SSSR and Vsesojuzny Nauchno-Issledovatelsky I Ispytateiny Institut Meditsinskoi Tekhniki, both of Moscow, U.S.S.R.**

**Continuation of Ser. No. 42,874, May 29, 1979, abandoned. This application Nov. 19, 1985, Ser. No. 799,210**
**Int. Cl.[4] A61K** *31/04, 9/22*
**U.S. Cl. 424—81** **13 Claims**

1. In the method of treating ischemic heart disease in patients subject to anginal pectoris by placing anti-anginal coronary vasodilating nitrates buccally for rapid arresting of anginal pectoris attacks, the improvement whereby said buccally placed coronary vasodilating nitrates are highly adhered and remain fixed and glued to a chosen site of the mouth mucosa to insure uniform delivery of said anti-anginal nitrate directly into the blood circulation system through the mouth mucosa, with the great advantage that it is possible to control and easily discontinue the nitrate uptake by removing the unresolved film in cases where it becomes necessary or, on the contrary, to renew the therapy, which comprises placing at a selected site of the mouth mucosa of said patient, an anti-anginal effective amount of said anti-angle nitrate admixed and dissolved in film form with a selected mouth mucosa-soluble, swellable and resolvable polymeric film-forming carrier, in which solutions of the biologically resolvable soluble polymer carrier and the active substance were mixed, and a film cast and dried until the residual amount of the solvent does not exceed about 10 percent by weight;

said resolvable, polymeric film forming carrier having been evaluated to determine its ability to provide immediate, uniform and substained release of a safe but adequate dose of said anti-anginal nitrate, for a particular patient, by:

(i) first applying a film of said soluble and resolvable carrier polymer containing no active anti-anginal ingredient, to a chosen site of the mouth mucosa of the patient in the region of the upper gum above the canine or premolars.

(ii) determining the time of full resolution of the film, and

(iii) preparing a film containing that dose of the active principle which should be given to the patient during the time required for full resolution of the film, thereby insuring continuous and optimal therapeutic effect during the entire period of dissolution of the film once the film containing the required amount of the anti-anginal preparation is applied to the chosen site of the mouth mucosa of the patient; said film-forming carrier having the ability to:

(a) form labile complex bonds with said anti-anginal coronary vasodilating nitrate;

(b) remain highly adhered to the mouth mucosa, but can be removed to interrupt or discontinue treatment; and

(c) release the active principle of said coronary vasodilator nitrate immediately, and thereafter at such a sustained rate and for a period of time that the pharmacodynamic effects as expressed by the mean data of the repeated individual selected standard physical loads with treadmill in combination with ECG-monitoring

(i) are detectable practically instantaneously after affixing to the mouth mucosa,
(ii) confirm tha presence of a continous therapeutic concentration of said active principle in the patient's blood during resolution of said carrier, and
(iii) confirm a bioavailability of said active principle in an amount substantially greater than that obtained with a sublingual nitroglycerin tablet as the standard.

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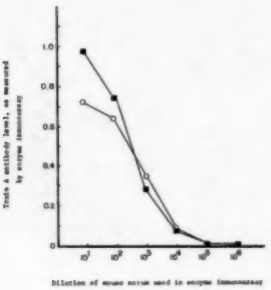
4,713,240

## VACCINES BASED ON INSOLUBLE SUPPORTS

Tracy D. Wilkins, Blacksburg, and David M. Lyerly, Radford, both of Va., assignors to Research Corporation, New York, N.Y.

Filed Apr. 4, 1985, Ser. No. 719,775
Int. Cl.[4] A61K *39/08*
U.S. Cl. 424—92 10 Claims




1. A vaccine composition useful in initiating an immune response against an organism of the genus Clostridium which comprises an immunogenic-effective amount of at least one non-enzymatic toxin of said organism covalently bonded or cross-linked to a water-insoluble support, in combination with a pharmaceutically acceptable carrier.

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4,713,241

## BACTERIAL INSECTICIDE AND PRODUCTION THEREOF

Yoshiharu Wakisaka, Hyogo; Junko Uo, Kyoto; Kouichi Matsumoto, Osaka; Osamu Ohodaira, Osaka, and Kentaro Tanaka, Osaka, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Division of Ser. No. 349,256, Feb. 16, 1982, abandoned. This application Oct. 15, 1984, Ser. No. 661,178
Claims priority, application Japan, Feb. 27, 1981, 56-28781
Int. Cl.[4] A01N *63/00;* C12N *1/20;* C12P *21/00;* C12R *1/07*
U.S. Cl. 424—93 6 Claims

1. A condensate or dried bacterial insecticidal substance produced by fermentation of *Bacillus thuringiensis* serovar. *kurstaki* 290–1 (ATCC 31813), in an organic culture medium therefor containing carbon and nitrogen sources at about 25° to 30° C. for about 2 to 5 days under highly aerobic conditions, said insecticidal substance being selected from the group consisting of (a) living cells of said microorganism containing crystalline δ-toxin, (b) dead cells of said microorganism containing said crystalline, δ-toxin, and (c) mixtures thereof.

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4,713,242

## SKIN THERAPEUTIC MIXTURE CONTAINING EUPATORIUM EXTRACT

Theodore Trenzeluk, Manville, N.J., assignor to Tecma Laboratories, Inc., Manville, N.J.

Filed Nov. 7, 1985, Ser. No. 795,882
Int. Cl.[4] A61K *33/30, 35/78*
U.S. Cl. 424—145 1 Claim

1. A skin therapeutic mixture for alleviating the conditions of acne, psoriasis, burns, pimples, blackheads, and open sores comprising: the extract from the dried leaves of the Eupatorium plant; sulfathiazole; zinc oxide; and petrolatum;

wherein said extract is about 7.4% by weight of said mixture; said sulfathiazole is about 3.7% by weight; said zinc oxide is about 14.2% by weight; and said petrolatum is about 74.7% by weight; and

wherein said extract is prepared from said Eupatorium plant as follows: the leaves of the plant are dried under moderate light, under warm temperatures, and with frequent tossing; the dried leaves are then ground to a very small particle size; and then the ground leaves are extracted with water.

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4,713,243

## BIOADHESIVE EXTRUDED FILM FOR INTRA-ORAL DRUG DELIVERY AND PROCESS

Michael T. Schiraldi, East Brunswick, N.J.; Martin M. Perl, Brooklyn, N.Y., and Howard Rubin, Rockaway, N.J., assignors to Johnson & Johnson Products, Inc., New Brunswick, N.J.

Filed Jun. 16, 1986, Ser. No. 874,904
Int. Cl.[4] A01N *59/10;* A61K *33/16*
U.S. Cl. 424—151 9 Claims

1. A pharmaceutically acceptable controlled-releasing medicament-containing extruded single or multi-layered thin film, capable of adhering to a wet mucous surface, comprising a water soluble or swellable polymer matrix bioadhesive layer which can adhere to a wet mucous surface and which bioadhesive layer consists essentially of 40–95% by weight of a hydroxypropyl cellulose having a molecular weight above 100,000, 5–60% of a homopolymer of ethylene oxide having a molecular weight from 3,000,000 to 5,000,000, 0–10% of a water-insoluble polymer selected from the group consisting of ethyl cellulose, propyl cellulose, polyethylene and polypropylene, and 2–10% of a plasticizer, said film having incorporated therein a pharmaceutically effective amount of said medicament.

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4,713,244

## SUSTAINED-RELEASE FORMULATION CONTAINING AN AMINO ACID POLYMER WITH A LOWER ALKYL ($C_1$–$C_4$) POLAR SOLVENT

Rajan Bawa, Fairport, and William G. Deichert, Macedon, both of N.Y., assignors to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Aug. 16, 1985, Ser. No. 766,734
Int. Cl.[4] A61K *31/74;* G03B *21/46;* C08F *226/10;* B29D *11/00*
U.S. Cl. 424—429 24 Claims

1. A sustained-release polymeric hydrogel dosage form useful for topical, systemic or transdermal administration of a medicinal agent comprising a cross-linked, polymerized hydrophilic polymer including an amino acid moiety in the polymer, in conjunction with a lower alkyl ($C_1$–$C_4$) polar solvent and said medicinal agent in a therapeutically effective amount.

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4,713,245

## GRANULE CONTAINING PHYSIOLOGICALLY-ACTIVE SUBSTANCE, METHOD FOR PREPARING SAME AND USE THEREOF

Shinji Ando; Masami Ohtaguro, both of Nagoya; Takayoshi Masuda, Tohkai, and Yoshimoto Watanabe, Kasugai, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed May 24, 1985, Ser. No. 737,407
Claims priority, application Japan, Jun. 4, 1984, 59-113192; Jun. 4, 1984, 59-113193; Jul. 31, 1984, 59-159193
Int. Cl.[4] A61K *9/42*
U.S. Cl. 424—438 6 Claims

1. In a method for preparing a granule containing physiologically-active substance which contains at least:

(A) a physiologically-active substance;

(B) a substance which is stable under neutral conditions but disintegrates or dissolves at a pH of 3 or less, said substance being selected from the group consisting of cellulose derivatives, polyvinyl derivatives, nitrogen-containing polysaccharides, metal salts of a polysaccharide and water-insoluble salts of an acid which is less acidic than hydrochloric acid and is acceptable to a living body, the amount of said substance ranging from 5 to 90 percent by weight based on the total amount of the granule; and

(C) at least one substance selected from the group consisting of straight-chain or branched, saturated or unsaturated monocarboxylic acids having 14 carbon atoms or more and salts thereof, animal fats having a melting point of 40° C. or higher, vegetable fats having a melting point of 40° C. or higher and waxes having a melting point of 40° C. or higher, the improvement which comprises subjecting said granule to a heat treatment to treat only the surface thereof at temperature higher than the melting point of said substance (C), thereby forming a protective film containing at least said substance (B) and (C) on the surface thereof.

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**4,713,246**

## ETOPOSIDE ORAL DOSAGE FORM

**Selima Begum; Ismat Ullah, and Bernard C. Nunning, all of Liverpool, N.Y., assignors to Bristol-Myers Company, New York, N.Y.**

**Continuation of Ser. No. 742,644, Jun. 10, 1985, abandoned, which is a continuation of Ser. No. 591,144, Mar. 19, 1984, abandoned. This application Apr. 2, 1986, Ser. No. 847,147**

**Int. Cl.[4] C07H** *15/20, 15/24;* **C07D** *317/44;* **A61K** *9/42*

**U.S. Cl. 424—455** **11 Claims**

1. A pharmaceutical solution dosage composition adapted for the oral adminstration of etoposide comprising (a) about 1 part by weight of etoposite, and on the basis of parts by weight per part of etoposide, (b) 5 to 9 parts by weight of polyethylene glycol, (c) 2.0 to 10 parts by weight of taurocholic acid, (d) 5% to 20% by weight of total solution ethanol, and (e) 0.1 to 0.5 parts by weight of an additional water-soluble organic carboxylic acid in such proportion as to form a homogeneous solution which is stable and free of precipitate and is acidic after dilution with water for a period of time sufficient to permit oral administration of said pharmaceutical dosage composition and absorption of the contents by a mammalian organism.

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**4,713,247**

## LONG-ACTING FORMULATION OF CEFACLOR

**Teruo Sakamoto; Sadao Kawai, both of Osaka; Kinzaburo Noda; Toyohiko Takeda, both of Hyogo, and Hiroshi Kato, Miyagi, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan**

**Filed May 30, 1984, Ser. No. 615,242**

**Claims priority, application Japan, Jun. 15, 1983, 58-108289**

**Int. Cl.[4] A61K** *9/62, 9/58, 31/78, 31/675*

**U.S. Cl. 424—461** **5 Claims**

1. A long-acting formulation of cefaclor which comprises a mixture of a non-enteric coated component of cefaclor as a rapid-release component with an enteric coated component of cefaclor as a slow release component at a ratio of about 4:6 based on the potency of cefaclor respectively, wherein:

said rapid release component contains at least one additive selected from the group consisting of lactose, sucrose, D-mannitol, corn starch, wheat starch, and low-substituted hydroxypropylcellulose in an amount of up to 75 wt % based on the whole rapid-release component; and said slow-release component contains at least one additive selected from the group consisting of lactose, sucrose, D-mannitol, corn starch, wheat starch, and low-substituted hydroxypropylcellulose in an amount of up to 75 wt % based on the whole slow-release component and is coated with an enteric coating film soluble in the pH range of 5.0 to 7.0.

**4,713,248**

## DIFFUSION COATED MULTIPLE-UNITS DOSAGE FORM

**Kim Kjornaes, Vaiby, and Jorgen Linnemann, Dragor, both of Denmark, assignors to A/S Alfred Benzon, Copenhagen, Denmark**

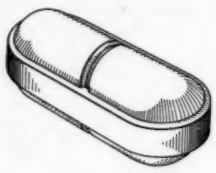
**PCT No. PCT/DK85/00006, § 371 Date Oct. 4, 1985, § 102(e) Date Oct. 4, 1985, PCT Pub. No. WO85/03437, PCT Pub. Date Aug. 15, 1985**

**PCT Filed Feb. 8, 1985, Ser. No. 786,967**

**Claims priority, application Denmark, Feb. 10, 1984, 621/84**

**Int. Cl.[4] A61K** *9/14, 9/22*

**U.S. Cl. 424—468** **15 Claims**



1. An oral pharmaceutical controlled release multiple-units formulation, comprising individual units constituted of an active substance coated with a substantially water-insoluble, but water-diffusible controlled release coating incorporating a homogeneous mixture of a water-dispersible film-forming agent and a polymeric substance which imparts compressibility to the coating.

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**4,713,249**

## CRYSTALLIZED CARBOHYDRATE MATRIX FOR BIOLOGICALLY ACTIVE SUBSTANCES, A PROCESS OF PREPARING SAID MATRIX, AND THE USE THEREOF

**Ulf Schröder, Fagottgränden 11 B, S-223 68 Lund, Sweden**

**PCT No. PCT/SE83/OC268, § 371 Date Feb. 22, 1984, § 102(e) Date Feb. 22, 1984, PCT Pub. No. WO84/00293, PCT Pub. Date Feb. 2, 1984.**

**Continuation of Ser. No. 588,099, Feb. 22, 1984, abandoned. This application Oct. 22, 1985, Ser. No. 789,933**

**Claims priority, application Sweden, Nov. 12, 1981, 8106723; Jul. 9, 1982, 8204244**

**Int. Cl.[4] A61K** *9/26;* **B01J** *13/02*

**U.S. Cl. 424—488** **12 Claims**

1. A composition useful for the prolonged release of a biologically-active substance comprising a sphere or particle comprising a non-covalently cross-linked crystalline polymeric carbohydrate matrix, said matrix incorporating 0.001–50% by weight of an absorbed or covalently bonded biologically-active substance.

10. A process for producing a composition useful for the prolonged release of a biologically-active substance, comprising,

(a) forming a solution of a polymeric carbohydrate and a biologically-active substance in one or more hydrophillic solvents;

(b) emulsifying the mixture of the carbohydrate and the biologically active substance in a liquid hydrophobic medium to form spherical droplets; and

(c) introducing the emulsion into a crystallizing medium to form spheres having a non-covalently cross-linked crystalline polymeric carbohydrate matrix, said matrix incorporating 0.001–50% by weight of the biologically-active substance.

4,713,250

## DOG FOOD PALATABILITY ENHANCER AND PROCESS

Henry J. Tonyes, Bourbonnais, Ill.; William T. Keehn, Danforth, Ill.; Harold W. German, Clifton, Ill., and Brian S. Hill, Denton, Tex., assignors to Gaines Pet Foods Corp., Chicago, Ill.

Continuation-in-part of Ser. No. 595,080, Mar. 30, 1984, abandoned. This application Jun. 9, 1986, Ser. No. 872,125

Int. Cl.[4] A23K *1/00*

U.S. Cl. 426—2 14 Claims

1. A process for preparing a dog food palatability enhancer, comprising:

(a) preparing a first stage reaction product by dispersing a substrate comprising a proteinaceous or farinaceous material in water and reacting the substrate with an enzyme or enzyme mixture comprising amylase when the substrate comprises farinaceous material and protease when the substrate comprises proteinaceous material, in amounts, under conditions of pH and temperature, and for a time effective to partially hydrolyze the substrate;

(b) preparing an emulsion comprising fat and said first stage reaction product; and then

(c) reacting said emulsion with lipase and protease in amounts, under conditions of pH and temperature, and for a time, effective to cause an enzyme reaction resulting in the production of a palatability enhancer.

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4,713,251

## PROCESS FOR ENCAPSULATING LIQUID ACIDS AND PRODUCT

Jon T. Seighman, North Olmsted, Ohio, assignor to Durkee Industrial Foods Corp., Iselin, N.J.

Filed Dec. 18, 1985, Ser. No. 810,662

Int. Cl.[4] A23L *1/216*

U.S. Cl. 426—96 7 Claims

1. A process for encapsulating liquid acids comprising the steps of

(a) preparing a water dispersion comprising water, at least one water dispersible matrix forming ingredient including a film forming amount of a film forming agent which on hardening forms a glasseous structure, a liquid acid and an acid buffering agent present in an amount effective to establish a pH of said dispersion in the range of about 4.4 to about 8.8;

(b) forming said water dispersion into a hot aqueous cook and carrying out the heat of said cook until a water content of less than amount 10% is obtained;

(c) extruding the dispersion of step (b) into a cold alcohol bath at a temperature effective for solidifying the matrix composition;

(d) the amount of matrix forming ingredient being an effective amount to encapsulate said acid and acid buffering agent, the matrix being free of acid and acid buffering agent on the external surface thereof.

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4,713,252

## PROCESS FOR PRODUCING A SEMI-MOIST FRUIT PRODUCT AND THE PRODUCTS THEREFROM

Amr A. Ismail, Machias, Me., assignor to Maine Wild Blueberry Co., Machias, Me.

Continuation-in-part of Ser. No. 763,603, Aug. 8, 1985, abandoned. This application Oct. 24, 1986, Ser. No. 923,107

Claims priority, application Canada, Sep. 12, 1985, 490526; Japan, Dec. 4, 1985, 60-271715

Int. Cl.[4] A23B *7/14*

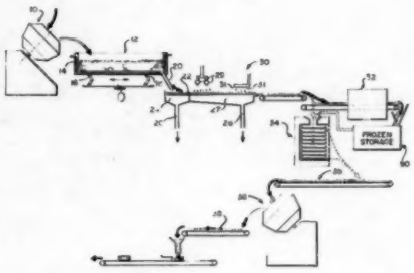
U.S. Cl. 426—290 24 Claims

1. A process for producing a sweetened, semi-moist fruit product having a moisture content in the range of 10% to 40% comprising:

(a) coating fresh or frozen fruit with an effective amount of sugar to initiate nondestructive osmotic fluid-sugar exchange;

(b) continuing the nondestructive osmotic fluid-sugar exchange within the fruit in which fruit juices migrate outward from the fruit and sugar migrates into the fruit by the osmotic exchange until the sugar concentration reaches an equilibrum across the fruit, without disturbing the natural skin of the fruit to produce a mixture of sugared fruit and sugared fruit syrup,

(c) separating the syrup from the fruit;




(d) rinsing the fruit to remove surface sugar and syrup from outside the fruit; and

(e) drying the sweetened fruit in a vacuum atmosphere of up to 400 microns Hg and suddenly releasing the vacuum atmosphere within 1 to 2 minutes to collapse the fruit to a relatively wrinkled solid, chewy and palatable condition.

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4,713,253

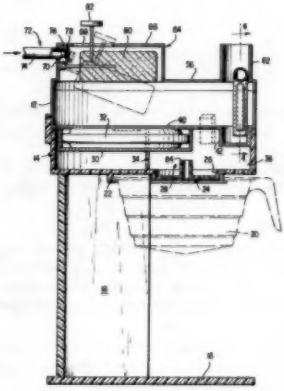
## FLOAT ACTIVATED SIPHON FOR AUTOMATIC DRIP COFFEE MAKER

Wayne B. Stone, Jr., Bethesda, Md., assignor to Wood Manufacturing, Flippin, Ark.

Continuation-in-part of Ser. No. 734,210, May 15, 1985, Pat. No. 4,622,230. This application Aug. 25, 1986, Ser. No. 899,725

Int. Cl.[4] A47J *31/00;* A23F *5/00*

U.S. Cl. 426—433 8 Claims



8. A method of making coffee, comprising:

heating a first body of water to coffee brewing temperature in a holding tank;

floating a buoyant member in said first body of water;

depressing said buoyant member in said first body of water and raising the level thereof;

transferring substantially all said body of water to basket contained coffee grounds;

introducing cold water to said holding tank to constitute a second body of water therein;

refloating said buoyant member in said second, body of water and valving off said cold water; and

heating said second body of water preparatory to making additional coffee.

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**4,713,254**

**CASEIN-SOLUBLE PROTEIN COMPLEX**

**Ernest A. Childs, and Rajagopalan Narasimhan, both of Green Bay, Wis., assignors to Schreiber Foods, Inc., Green Bay, Wis.**

**Filed Oct. 30, 1980, Ser. No. 202,237**

**Int. Cl.[4] A23C** *19/08, 20/00;* **A23J** *1/20*

**U.S. Cl. 426—582** **109 Claims**

1. A process for recovering a curd of casein and soluble proteins from an aqueous medium comprising:

(a) adjusting the pH of the aqueous medium to an alkaline pH of less than about 8.0; then

(b) heating the aqueous medium to a temperature in the range of about 65.6° C. to 85.0° C.; and

(c) holding the heated aqueous medium for a time period sufficient to permit the formation of casein-soluble protein complex; then

(d) adjusting the temperature of the aqueous medium to the range of about 32.2° C. and 76.7° C.; and

(e) adjusting the pH of the aqueous medium to the range of 4.2 to 5.5 to precipitate the casein-soluble protein complex in the aqueous medium; and then

(f) separating the complex precipitate from the aqueous medium to recover a curd of casein and soluble proteins, said curd being useful as both the curd ingredient in the making of natural cheeses and as the natural cheese ingredient in the making of processed and imitation cheeses.

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**4,713,255**

**EMULSIFICATION SYSTEM FOR CREAMY CHEESE FOOD PRODUCTS**

**William J. Horan, Dover, Del., and Jeffrey M. Schweid, Haverhill, Mass., assignors to General Foods Corporation, White Plains, N.Y.**

**Continuation-in-part of Ser. No. 718,395, Apr. 1, 1985, abandoned. This application Dec. 5, 1986, Ser. No. 938,700**

**Int. Cl.[4] A23L** *1/24*

**U.S. Cl. 426—589** **6 Claims**

1. A process for preparing a dry mix salad dressing containing cheese solids which makes a creamy cheese salad dressing with mild hand shaking and will remain in emulsion and not separate at up to 15% reduction in the aqueous phase, comprising:

(a) blending spices, salt, cheese flavoring containing no cheese solid, sugar, sodium citrate and monosodium glutamate to form a uniform first part;

(b) contacting the blended first part with heated polysorbate 60 while mixing;

(c) blending cheese flavoring containing up to 50% whey solids; cheese containing up to 70% cheese solids, gums and dextrin in an amount sufficient to disperse the cheese solids to form a uniform second part;

(d) combining the blended first part with the blended second part and mixing to form a homogeneous mixture, wherein the weight ratio of the first part contacted with polysorbate 60 and the second part combined with dextrin is 60:55 to 39:45.

**4,713,256**

**PROCESS FOR PREPARING A CHOCOLATE PASTE**

**Henri Chaveron, Paris; Jean Pontillon, Meulan; Michel Billon, Unieux; Hervé Adenier, Compiegne, all of France, and Ahmed Kamoun, Sfax, Tunisia, assignors to Clextral, Paris, France**

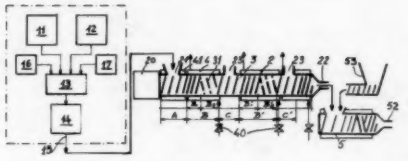
**PCT No. PCT/FR84/00192, § 371 Date Apr. 26, 1985, § 102(e) Date Apr. 26, 1985, PCT Pub. No. WO85/00957, PCT Pub. Date Mar. 14, 1985**

**PCT Filed Aug. 24, 1984, Ser. No. 731,622**

**Claims priority, application France, Aug. 26, 1983, 83 13769**

**Int. Cl.[4] A23G** *1/16*

**U.S. Cl. 426—631** **8 Claims**




1. Process for the continuous preparation of a chocolate paste, comprising the steps of:

(a) introducing, at an upstream end of a screw conveyor having a plurality of treatment zones (A, B, C, D) and comprising an elongated sleeve surrounding at least two screws (**3**) driven in rotation and provided with means (**41, 42**) for regulating the temperature of entrained material, a refined paste comprising cocoa, refined sugar and a small portion of fatty materials

(b) effecting dry conching of said refined paste in a first section of said screw conveyor, said dry conching comprising the steps of

(i) simple kneading of said refined paste in a first step (A), accompanied by a rise in temperature;

(ii) at least one further kneading step (B) producing rolling and shearing effects of progressively increasing intensity, said intensity being coordinated with said temperature regulating means (**41, 42**); and

(iii) a degasifying step (C) following each said further kneading step (B);

(c) introducing downstream of said first section of said screw conveyor remaining portions of ingredients comprising a portion of said fatty materials greater than said previously introduced small portion, and then

(d) effecting liquid conching in a second portion of said screw conveyor, said liquid conching comprising a step (D) producing combined kneading, rolling and shearing effects.

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**4,713,257**

**SPRAYING METHOD AND DEVICE FOR APPLYING A FILM TO A WORKPIECE**

**Jürgen Luttermöller, Bielefeld, Fed. Rep. of Germany, assignor to Kopperschmidt-Müller GmbH & Co. KG, Bielefeld, Fed. Rep. of Germany**

**Filed Feb. 19, 1986, Ser. No. 830,972**

**Claims priority, application Fed. Rep. of Germany, Feb. 19, 1985, 3505618**

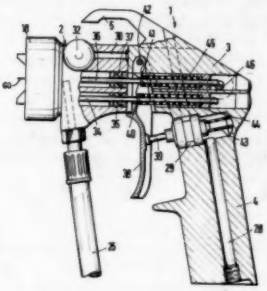
**Int. Cl.[4] B05D** *1/04;* **B05B** *5/04, 7/06*

**U.S. Cl. 427—27** **30 Claims**

1. A method of applying a film to a workpiece, comprising the steps of atomizing a material to generate a first spray within a predetermined space; atomizing a material to generate a second spray which surrounds said space, one of said sprays being generated pneumatically and the other of said sprays being generated hydrostatically; and directing said sprays against said workpiece.

17. A device for applying a film to a workpiece, comprising

a spray head; first nozzle means in said head for generating a first spray within a predetermined space; second nozzle means in said head for generating a second spray which surrounds said space, said second nozzle means comprising a substantially circumferentially complete material discharge nozzle and a substantially circumferentially complete air discharge nozzle, said air discharge nozzle surrounding said material discharge



nozzle and each of said nozzles surrounding said first nozzle means; material supply means for supplying material to be pneumatically atomized to said second nozzle means and for supplying material to be hydrostatically atomized to said first nozzle means; air supply means for supplying at least one current of atomizing air to said second nozzle means; and control means for said air and material supply means.

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**4,713,258**

## METHOD OF FORMING ULTRAFINE PATTERNS

**Shizuo Umemura, Ibaraki, Japan, assignor to Research Development Corporation of Japan, Tokyo, Japan, a part interest**

**Filed Jul. 3, 1985, Ser. No. 752,208**

**Claims priority, application Japan, Aug. 6, 1984, 59-163881**

**Int. Cl.[4] B05D** *3/06*

**U.S. Cl. 427—35** **12 Claims**

1. A method of forming an ultrafine pattern on a substrate, which consists essentially of the steps of: holding a substrate in a highly evacuated system that employs an oil diffusion pump as a vacuum source, the atmosphere in said highly evacuated system comprising a vapor of the operating oil of the oil diffusion pump; then projecting a focused electron beam in a pattern against a surface of said substrate and thereby forming a pattern of adsorption sites comprised of adsorbates or deposits of said vapor of said operating oil on the irradiated area on said surface of said substrate; and then depositing a pattern-forming substance onto said substrate so that said substance adheres to said adsorption sites and forms a pattern having a width of 1000 Å or finer.

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**4,713,259**

## METHOD FOR THE GLOW-DISCHARGE-ACTIVATED REACTIVE DEPOSITION OF ELECTRICALLY CONDUCTIVE MATERIAL FROM A GASEOUS PHASE

**Georg F. Gärtner, Aachen; Peter A. Janiel, Würselen, and Hans-Jürgen Lydtin, Stolberg, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Apr. 28, 1986, Ser. No. 856,917**

**Claims priority, application Fed. Rep. of Germany, May 4, 1985, 3516078**

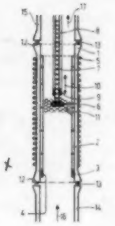
**Int. Cl.[4] B05D** *3/06*

**U.S. Cl. 427—39** **18 Claims**

1. A method for the reactive deposition of tubular bodies of an electrically conductive material from a flowing gas phase on a tubular substrate in which a glow discharge is produced between an inner electrode and an outer electrode, one of which is constructed to be tubular and serves as a substrate, characterized in that

(a) a controlled reciprocating movement occurs of the inner electrode relative to the outer electrode,

(b) a localized glow discharge zone is produced between the inner electrode and the outer electrode and is maintained during deposition,



(c) measures are taken to prevent the formation of electrically conductive layers on electrically insulating structural parts in the reaction space, and

(d) the temperature in the substrate area is kept constant at a low value at which the thermal deposition rate is small compared with the deposition rate with glow discharge.

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**4,713,260**

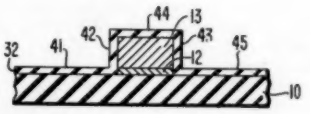
## METHOD OF ENSURING ADHESION OF CHEMICALLY VAPOR DEPOSITED OXIDE TO GOLD INTEGRATED CIRCUIT INTERCONNECT LINES

**Bruce E. Roberts; Jimmy C. Black, both of Palm Bay, and Dyer A. Matlock, Melbourne, all of Fla., assignors to Harris Corporation**

**Division of Ser. No. 768,326, Aug. 22, 1985. This application May 4, 1987, Ser. No. 45,526**

**Int. Cl.[4] B05D** *5/12, 3/06*

**U.S. Cl. 437—238** **13 Claims**




1. A method of adhesively bonding a layer of silicon dioxide to a layer of gold comprising the steps of:

(a) forming a thin film of titanium on the surface of said gold layer;

(b) converting said titanium to an oxide of titanium; and

(c) forming a layer of silicon dioxide on said film of said oxide of titanium.

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**4,713,261**

## METHOD FOR PREPARING FERROMAGNETIC IRON OXIDE PARTICLES

**Kouichi Masaki, and Tatsuji Kitamoto, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Nov. 10, 1986, Ser. No. 928,352**

**Claims priority, application Japan, Nov. 8, 1985, 60-249019**

**Int. Cl.[4] B05D** *5/12*

**U.S. Cl. 427—129** **6 Claims**

1. A method for preparing ferromagnetic iron oxide particles which comprises depositing a cobalt compound onto a surface of lepidocrosite (γ-FeOOH) particles, and then calcining the particles at 150° C. to 350° C.

## 4,713,262
## MANUFACTURING METHOD FOR A MAGNETIC RECORDING MEDIUM

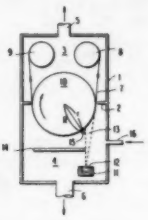
**Tadashi Yasunaga, and Ryuji Shirahata, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 765,482, Aug. 14, 1985, abandoned. This application Oct. 2, 1986, Ser. No. 914,513**

**Claims priority, application Japan, Aug. 14, 1984, 59-169857; Aug. 14, 1984, 59-169859; Aug. 14, 1984, 59-169860**

**Int. Cl.[4] H01F** *10/02*

**U.S. Cl. 427—130** **19 Claims**



1. A method for manufacturing a magnetic recording medium, comprising evaporating a magnetic metal material from an evaporation source to form a vapor stream of the magnetic metal material in a vacuum vessel, vapor-depositing the magnetic metal material on a tape-shaped substrate moving along a cooling can such that the incident angle ($\theta$) of the vapor stream which is incident upon the substrate changes continuously from a high incident angle ($\theta$max) to a low incident angle ($\theta$min), and at the same time introducing one or more gases selected from the group consisting of a rare gas, $CO_2$ gas, $N_2$ gas, and nitrogen oxide gas, or a mixed gas composed of oxygen gas and one or more gases selected from the group consisting of a rare gas, $CO_2$ gas, $N_2$ gas and nitrogen oxide gas from a gas inlet nozzle disposed at a position in the vicinity of the substrate and near the vapor stream at a low incident angle ($\theta$min) upon the substrate, thereby providing a ferromagnetic metal film on the substrate, wherein the gas inlet nozzle is disposed so that the ratio (R/r) of a distance (R) from the center of said cooling can to said gas inlet nozzle to the radius (r) of said cooling can is within the range of 1.10 or less, wherein a mask is disposed between the evaporation source and the tape-shaped substrate, which mask is separate from the gas inlet nozzle and which mask controls the incident angle ($\theta$) of the vapor stream so that only vapor stream of the desired incident angle ($\theta$) contacts the tape-shaped substrate.

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## 4,713,263
## ETHYLENE VINYL ACETATE COMPOSITIONS FOR FLOCKING ADHESIVES

**David Lunsford, Mauldin, S.C., and James L. Walker, Whitehouse Station, N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.**

**Division of Ser. No. 861,964, May 12, 1986. This application May 13, 1987, Ser. No. 49,237**

**Int. Cl.[4] B05D** *1/14, 1/16, 1/36*

**U.S. Cl. 427—206** **9 Claims**

1. A process for manufacturing a flocked article which comprises the steps of:

(I) applying to the substrate to be flocked a foamed composition comprising, a thickener selected from the group consisting of hydroxyethylcellulose, carboxymethylcellulose, polyacrylate-hydrolyzed acrylonitrile and carboxylic acid/acrylate emulsions or solutions, pigments, a foaming agent activatable by heating air or another gas into the composition comprising a water soluble salt of an aliphatic carboxylic acid containing 16 to 20 carbon atoms, and an aqueous emulsion, the latter prepared by the emulsion polymerization of:

(a) a vinyl ester of an alkanoic acid having 1 to 13 carbon atoms interpolymerized with the following comonomers:

(b) 5 to 30% by weight of ethylene;

(c) 0.5 to 6% by weight of N-methylol acrylamide or N-methyl methacrylate;

(d) 1 to 5% by weight of an alkenoic acid having 3 to 6 carbon atoms or an alkenedioic acid having 4 to 6 carbon atoms;

(e) 0.2 to 3% by weight of a latex stabilizer; and

(f) 0 to 1% by weight of at least one polyunsaturated copolymerization monomer; the vinyl ester being added in an amount to total 100%, said adhesive being applied in an amount of 0.5 to 3.0 ounces per square yard;

(II) applying the flocking fibers to the coated substrate; and

(III) drying said flocked substrate.

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## 4,713,264
## PROCESS OF FORMING PREPASTED WALLCOVERINGS

**John B. Clarke; John F. Firth, and John R. Walker, all of West Yorkshire, England, assignors to Allied Colloids Limited, England**

**Filed Oct. 4, 1985, Ser. No. 784,824**

**Claims priority, application United Kingdom, Oct. 4, 1984, 8425155**

**Int. Cl.[4] B05D** *5/10*

**U.S. Cl. 427—207.1** **20 Claims**

1. A process of forming a prepasted wallcovering comprising a porous surface that carries a dry coating comprising discrete polymer particles that become adhesive when the coating is wetted by water, the process comprising applying to the surface a dispersion of polymer particles having a dry size below 10 microns in a non-aqueous liquid and that is stabilised by a polymeric stabiliser which is an oil at 25° C. and then evaporating the non-aqueous liquid and in which a dried residue of the dispersion does not form a coherent film.

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## 4,713,265
## PROCESS FOR CURING A COATING COMPOSITION OF AN ACRYLIC POLYMER AND A POLYISOCYANATE WITH AN AMINE VAPOR CATALYST

**Robert C. Nahas, Voorhees, N.J., and Clifford H. Strolle, Springfield, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 804,134, Dec. 3, 1985, Pat. No. 4,659,799. This application Nov. 17, 1986, Ser. No. 931,078**

**Int. Cl.[4] B05D** *3/04*

**U.S. Cl. 427—341** **13 Claims**

1. A process comprising (1) applying a coating composition to a substrate and (2) exposing the composition to a vaporous amine catalyst to cure the composition; wherein the composition comprises about 20°80% by weight of film forming binder and correspondingly about 80°20% by weight of a liquid carrier; wherein the binder consists essentially of

(a) an acrylic polymer containing hydroxyl groups and amine containing groups selected from the group consisting of secondary amine groups, tertiary amine groups, pyridine groups, amino ester groups, hydroxy aminoester groups and the polymer has a weight average molecular weight of about 2,000–50,000 determined by gel permeation chromatography using tolymethyl methacrylate as the standard and wherein the acrylic polymer consists essentially of (1) polymerized monomers of an alkyl methacrylate or an alkyl acrylate and mixtures thereof wherein the alkyl groups have 1–12 carbon atoms, (2) polymerized monomers of hydroxyl alkyl methacrylate or hydroxy alkyl acrylate or mixtures thereof wherein the alkyl groups have 2–4 carbon atoms and (3) polymerized ethylenically unsaturated amine containing monomer; and

(b) an aliphatic polyisocyanate.

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**4,713,266**

## METHOD FOR PRODUCTION OF POLYESTER STRUCTURES WITH IMPROVED GAS BARRIER PROPERTY

**Kenji Hasegawa, Hirakata; Tetsuo Sato, Kyoto, and Teruo Iwanami, Ibaraki, all of Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**PCT No. PCT/JP86/00199, § 371 Date Dec. 12, 1986, § 102(e) Date Dec. 12, 1986, PCT Pub. No. WO86/06392, PCT Pub. Date Nov. 6, 1986**

**PCT Filed Apr. 18, 1986, Ser. No. 16,698**

**Claims priority, application Japan, Apr. 19, 1985, 60-84726**

**Int. Cl.⁴ B05D** *3/02*

**U.S. Cl. 427—412.5** **8 Claims**

1. A method of producing a polyester structure with improved gas barrier property comprising coating a polyester substrate structure with a solution of a vinyl alcohol resin having a high gas barrier property, characterized in that the surface of the polyester substrate structure is precoated with a solvent solution of a polyester having the following formulation and an intrinsic viscosity of at least 0.4 and dried to provide an anchor coating layer on said surface:

| | |
|---|---|
| Acid component: | |
| Terephthalic acid and/or isophthalic acid | 90 to 40 mol % |
| An aliphatic dicarboxylic acid containing 2 to 12 carbon atoms | 10 to 60 mol % |
| Diol component: | |
| A straight-chain or cyclic diol containing 2 to 8 carbon atoms | 90 to 10 mol % |
| A branched diol containing 3 to 6 carbon atoms | 10 to 90 mol % |

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**4,713,267**

## DECORATIVE RIBBON AND SHEET MATERIAL

**Bernard S. Truskolaski, Lake Elmo, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Continuation-in-part of Ser. No. 722,233, Apr. 15, 1985, abandoned. This application Apr. 22, 1986, Ser. No. 855,002**

**The portion of the term of this patent subsequent to Jan. 6, 2004, has been disclaimed.**

**Int. Cl.⁴ D04D** *7/10*

**U.S. Cl. 428—4** **24 Claims**

1. Decorative sheet material comprising

(a) a thermally bonded nonwoven tissue-like base layer having (i) a web of 20 to 90 weight percent thermally bondable polymeric staple fibers having a length of from about ¼ to 6 inches and 10 to 80 weight percent rayon staple fibers having a length of from about ¼ to 6 inches and (ii) 5 to 50 weight percent thermobonding resin based on the weight of the web, and

(b) at least a monolayer of a multiplicity of substantially parallel continuous multifilament acetate yarns substantially covering a first side of said base layer and thermally laminated to said base layer,

the second side of said base layer being sufficiently sonically sealable to a base layer of a second sheet material to form durable ribbon assemblies.

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**4,713,268**

## CRYSTALLIZABLE POLYESTER RESIN HAVING HIGH IMPACT STRENGTH AND DIMENSIONAL STABILITY

**William G. Carson, Moorestown, N.J., assignor to Rohm and Haas Co., Philadelphia, Pa.**

**Filed Dec. 5, 1986, Ser. No. 938,224**

**Int. Cl.⁴ B65D** *5/00;* **B32B** *27/08, 27/36*

**U.S. Cl. 428—35** **38 Claims**

1. A tough, ovenable tray comprising a thermoformed, crystalline sheet of modified polyester resin, the resin comprising

(A) from about 70 to about 95% of a poly(ethylene terephthalate) resin having an intrinsic viscosity from about 0.7 to about 1.1 dl/g,

(B) from about 4 to about 29% of core/shell polymer having

(1) from about 25 to about 95% of a first elastomeric phase polymerized from a monomer system comprising

(a) from about 75 to about 99.8% of a monomer or monomer mixture which yields a rubbery polymer on polymerization,

(b) from about 0.1 to about 5% crosslinking monomer, and

(c) from about 0 to about 5% graftlinking monomer, and

(2) from about 5 to about 75% of a rigid vinyl thermoplastic phase polymerized from a monomer system comprising from about 50 to 100% of an alkyl methacrylate wherein the alkyl group has from 1 to 4 carbon atoms,

(C) from about 1 to about 5% of a poly(alkylene terephthalate) crystallization-rate accelerator, the alkylene group having from 4 to 6 carbon atoms, and

(D) from 0 to about 14.5% of an aromatic polycarbonate of a di(monohydroxyphenol)-substituted aliphatic hydrocarbon wherein the hydrocarbon has 2 to 4 carbon atoms.

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**4,713,269**

## HEATSET MULTILAYER CONTAINER

**Saleh A. Jabarin, Holland, and Prakash R. Ajmera, Toledo, both of Ohio, assignors to Owens-Illinois Plastic Products Inc., Toledo, Ohio**

**Filed Mar. 20, 19[illegible], Ser. No. 841,651**

**Int. Cl.⁴ B65D** *1/40*

**U.S. Cl. 428—35** **11 Claims**

1. A transparent hollow delamination resistant, thermally stable multilayer article obtained by blowmolding and heatsetting a parison composed of at least one layer containing poly(ethylene terephthalate) directly adhered to at least one barrier layer containing a copolyester which consists essentially of: (A) reactant(s) selected from the group consisting of isophthalic acid, terephalic acid, and their $C_1$ and $C_4$ alkyl esters, and any mixture thereof in any proportion; (B) reactant(s) 1,3 bis(2-hydroxyethoxy)benzene plus ethylene glycol, and optionally one or more other ester forming dihydroxy organic hydrocarbon reactant(s), and optionally, (C) reactant, bis(4-beta-hydroxyethoxyphenyl)sulfone, wherein:

(1) the amount of said 1,3 bis(2-hydroxyethoxy)benzene is 5 to 90 mole percent of the amount of (A) reactant(s),

(2) the combined amount of (B) and (C) reactant is about 110 to 300 mole percent of the amount of (A) reactants,

(3) the amount of said ester forming dihydroxy organic hydrocarbon reactant(s) is zero to 20 mole percent of the amount of said (A) reactants, and

(4) the combined amount of said (C) reactant plus said 1,3 bis(2-hydroxyethoxy)benzene and said other ester forming dihydroxy organic hydrocarbon reactant(s) is not over 90 mole percent of said (A) reactants,

said copolyester being present in an amount from about 10 percent to about 30 percent, by weight, of said article.

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**4,713,270**

**HEATSET HIGH BARRIER CONTAINER**

**Saleh A. Jabarin, Holland, and Prakash R. Ajmera, Toledo, both of Ohio, assignors to Owens-Illinois Plastic Products Inc., Toledo, Ohio**

**Filed Mar. 20, 1986, Ser. No. 841,649**

**Int. Cl.[4] B65D *1/00***

**U.S. Cl. 428—35** **3 Claims**

1. A transparent hollow high barrier, thermally stable article obtained by blow molding and heatsetting an intimate fusion blend of

a poly(ethylene terephthalate), and a high barrier copolyester formed of the polymeric reaction product of (A) reactant(s) selected from the group consisting of isophthalic acid, terephalic acid, and their $C_1$ to $C_4$ alkyl esters, and any mixture thereof in any proportion, (B) reactants, 1,3(2-hydroxyethoxy)benzene plus ethylene glycol, and optionally one or more other ester forming dihydroxy organic hydrocarbon reactant(s), and optionally, (C) reactant, bis(4-betahydroxyethoxyphenyl)sulfone, wherein:

(1) the amount of said 1,3 bis(2-hydroxyethoxy)benzene is 5–90 mole percent of the amount of A reactants,

(2) the combined amount of B and C reactant is about 110 to 300 mole percent of the amount of A reactants,

(3) the amount of said other ester forming dihydroxy organic hydrocarbon reactant(s) is zero to 20 mole percent of the amount of said A reactants, and

(4) the combined amount of said (C) reactant plus said 1,3 bis(2-hydroxyethoxy)benzene and said other ester forming dihydroxy organic hydrocarbon reactant(s) is not over 90 mole percent of said A reactants,

said copolyester being present in an amount from about 20 percent to about 30 percent, by weight, of said article.

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**4,713,271**

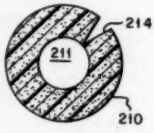
**FOAMED POLYMER TUBING**

**Alonzo H. Searl, Fort Worth; Granville J. Hahn, and Raleigh N. Rutledge, both of Big Spring, all of Tex., assignors to Cosden Technology, Inc., Dallas, Tex.**

**Continuation-in-part of Ser. No. 393,911, Jun. 30, 1982, abandoned. This application Jun. 24, 1983, Ser. No. 507,373**

**Int. Cl.[4] B32B *31/00***

**U.S. Cl. 428—36** **12 Claims**




1. A foamed insulation tubing for placement around pipes and tubes, said tubing comprising:

a predetermined length of tubing having an open central bore and a predetermined wall thickness;

said length of tubing having a longitudinal slit cut partially through the wall thereof for substantially the entire length of said tubing; and,

said ends of said tubing being cut parallel at generally 45 degree angles to the longitudinal axis of said tubing.

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**4,713,272**

**LONGITUDINALLY DIVIDED SLEEVE OF SHRINKABLE MATERIAL**

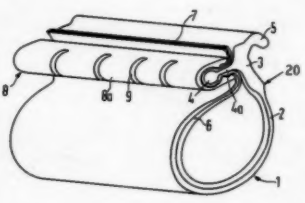
**Ernst Bachel, Geltendorf, and Wolfgang Giebel, Planegg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed May 20, 1986, Ser. No. 865,004**

**Claims priority, application Fed. Rep. of Germany, May 23, 1985, 3518580**

**Int. Cl.[4] B32B *1/08***

**U.S. Cl. 428—36** **17 Claims**




1. A longitudinally divided sleeve of heat shrinkable material comprising an elongated, separate clamping element and a sheet of flexible heat shrinkable material having a first and second longitudinally extending edge, said sheet having a single longitudinally extending closure element extending along the first longitudinal edge , said closure element having a longitudinally extending bead portion connected by a narrow neck portion to an enlarged base, said sleeve being closed by said bead and neck portion having the sheet of flexible material adjacent the second edge wrapped therearound with said clamping element holding the wrapped around portion of the sheet on said bead, said clamping element having a U-shaped with an inside profile matched to a profile of the bead and neck portion and being dimensioned to receive the bead with a portion of the sheet wrapped around the bead to form a closure region, an inside profile of the clamping element including at least one pair of latching projections to hold the clamping element on the bead so that articles of different diameters can be enveloped by adjusting the diameter of the sleeve, and then using optimum shrinking of the sleeve.

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**4,713,273**

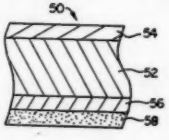
**COMPOSITE FACESTOCKS AND LINERS**

**Melvin S. Freedman, Beachwood, Ohio, assignor to Avery International Corporation, Pasadena, Calif.**

**Continuation-in-part of Ser. No. 699,204, Feb. 5, 1985, abandoned. This application Apr. 18, 1986, Ser. No. 853,772**

**Int. Cl.[4] C09J *7/02*; B32B *27/08***

**U.S. Cl. 428—40** **30 Claims**




1. A liner comprising a multilayer web construction for use with label, tape or sign stock, said web construction comprising a coextrudate in the form of at least two firmly adhered

layers, at least one of said layers comprising a multiphase layer including a continuous phase of polymeric film material and a discontinuous phase of filler material, said liner having at least one face that is roughened at least in part by the mechanical effect of the filler material contained in said coextrudate, to a roughness of at least about 10 Sheffield units, a release face provided on one face of said liner.

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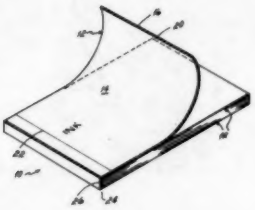
**4,713,274**

## PAD OF SHEETS FOR REMOVING PARTICULATE MATTER

**Cathy L. Minor, 7503 Constitution Dr., Cincinnati, Ohio 45215**

**Filed Aug. 18, 1986, Ser. No. 897,622**
**Int. Cl.[4] B32B** *3/06, 7/06*
**U.S. Cl. 428—40** **2 Claims**



1. A pad of sheets for removing undesirable particulate matter from a surface to be cleaned, said pad comprising in combination:

(a) a plurality of individual flexible sheets capable of accepting an adhesive coating, said individual flexible sheets each having four edges wherein a line is scored onto said individual flexible sheet along a length parallel to an edge and spaced inward therefrom;

(b) an adhesive coating covering the entire surface of one side of each flexible sheet which preferentially binds to said flexible sheet and which removes undesirable particulate matter upon contacting a surface to be cleaned;

(c) a cover sheet which covers and protects said adhesive coating on each flexible sheet from undesired contact prior to use, said cover sheet capable of being separated from said adhesive coating without disrupting said adhesive coating; and

(d) adhesive means, along the aforementioned edge of the pad, for joining said flexible sheets and cover sheets together to form a pad and which adhesive means permit a single flexible sheet to be easily removed from the pad and cover sheet.

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**4,713,275**

## CERAMIC/CERAMIC SHELL TILE THERMAL PROTECTION SYSTEM AND METHOD THEREOF

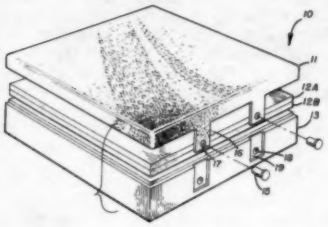
**Salvatore R. Riccitiello; Marnell Smith, both of San Jose; Howard E. Goldstein, Saratoga, and Norman B. Zimmerman, Los Gatos, all of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed May 14, 1986, Ser. No. 862,925**
**Int. Cl.[4] B32B** *1/06*
**U.S. Cl. 428—76** **22 Claims**

1. A ceramic composite tile device specially adapted for use as a component of a reusable thermal protection system for use on the surface of an object in need of thermal protection, which device comprises:

(a) a ceramic-coated ceramic-fabric upper shell itself comprising a woven ceramic fabric in the shape of an upper shell wherein the upper shell is coated with additional ceramic by chemical vapor deposition and chemical vapor infiltration;

(b) ceramic lower base tile, wherein the upper shell and lower base tile are stress/strain independent; and,



(c) one or more layers of flexible or rigid ceramic insulation interposed in the interior cavity formed by the attachment of component (a) to component (b).

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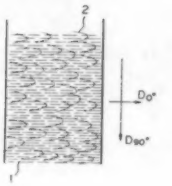
**4,713,276**

## PAPER-LIKE PRODUCT, METHOD AND APPARATUS FOR PRODUCTION THEREOF AND PREPREG FORMED OF SAID PAPER-LIKE PRODUCT

**Hajime Gotoh; Mamoru Machida, and Osamu Sugiyama, all of Nagoya, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan**

**Filed Mar. 20, 1985, Ser. No. 713,987**
**Claims priority, application Japan, Mar. 21, 1984, 59-53788; Jun. 28, 1984, 59-133551; Oct. 19, 1984, 59-220070; Nov. 1, 1984, 59-230764; Dec. 12, 1984, 59-188385[U]**
**Int. Cl.[4] B21F** *1/02;* **D21E** *11/00;* **D21F** *11/04*
**U.S. Cl. 428—113** **17 Claims**



1. A paper-like product composed of (a) staple fibers oriented substantially in a direction orthogonal to the longitudinal direction of the paper-like product and (b) binder fibers which are staple fibers having portions parallel and perpendicular to the oriented staple fibers (a); said staple fibers (a) having an orientation degree, expressed by the following formula:

$$\text{orientation degree (\%)} = \frac{\text{number of staple fibers oriented within } \pm 5^\circ \text{ to direction orthogonal to longitudinal direction of paper-like product}}{\text{total number of staple fibers in paper-like product}} \times 100$$

of at least 50%, and the proportioin of the binder fibers (b) being at least about 1.5% by weight based on the total fibers.

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## FOAMED METAL AND METHOD OF PRODUCING SAME

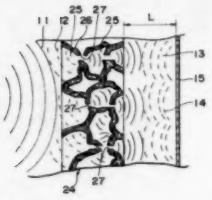
Shigeru Akiyama; Hidetoshi Ueno; Koji Imagawa; Akira Kitahara; Sumio Nagata, all of Tosu; Kazuo Morimoto, Amagasaki; Tooru Nishikawa, Amagasaki, and Masao Itoh, Amagasaki, all of Japan, assignors to Agency of Industrial Science and Technology, Tokyo and Shinko Kosen Kogyo Kabushiki Kaisha, Amagasaki, both of, Japan

Filed Jul. 18, 1986, Ser. No. 886,678

Claims priority, application Japan, Jul. 19, 1985, 60-160804; Dec. 25, 1985, 60-297832; Jan. 27, 1986, 61-9972[U]

Int. Cl.[4] E04B *1/82;* B32B *3/10, 3/24, 15/00*

U.S. Cl. 428—131 3 Claims




3. An electromagnetic shielding material consisting of a foamed metal plate having an apparent specific gravity of from 0.2 to 0.8 and comprising an aggregate of uniform size and uniformly dispersed of polygonal closed cells having an average diameter of from 2 to 10 mm, provided with through-holes, wherein the diameter of the through-holes communicating both sides of said plate to each other is not larger than 5 mm.

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4,713,278

## MAGNETIC RECORDING MEDIUM

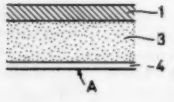
Kuniichi Yoda; Eiji Kitaura; Tsutomu Tsunoda, all of Saku, and Yoshio Kawakami, Nagano, all of Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Sep. 4, 1986, Ser. No. 904,123

Claims priority, application Japan, Sep. 9, 1985, 60-197802

Int. Cl.[4] G11B *5/70*

U.S. Cl. 428—141 4 Claims




1. A magnetic recording medium comprising a light-shielding base in the form of a tape or sheet, and a magnetic layer composed of a magnetic powder of Co-coated $\gamma Fe_2O_3$ dispersed in a resin binder and applied to the upper surface of the base, said powder having a specific surface area as determined by the BET adsorption method of at least 35 $m^2/g$, said base having a surface roughness of 0.012 μm or less in terms of the centerline average surface roughness and said base having a light transmittance of 30% or less.

4,713,279

## MAGNETIC RECORDING MEDIUM

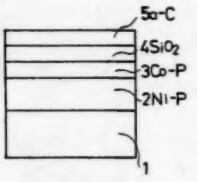
Norio Fujiwara; Nobuyuki Takahashi, and Akihiro Otsuki, all of Kawasaki, Japan, assignors to Fuji Electric Co., Ltd., Kawasaki, Japan

Filed Apr. 15, 1986, Ser. No. 852,151

Claims priority, application Japan, Apr. 19, 1985, 60-84001

Int. Cl.[4] G11B *5/72*

U.S. Cl. 428—142 13 Claims




1. A magnetic recording medium comprising
a non-magnetic base plate,
a magnetic layer formed on said plate,
a protective layer comprising silicon dioxide formed on said magnetic layer, and
a lubricant layer comprising amorphous carbon formed on said protective layer.

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4,713,280

## RECEPTOR SHEET FOR IMPACT PRINTERS

Donald J. Williams, White Bear Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jul. 29, 1986, Ser. No. 891,231

Int. Cl.[4] B32B *5/16, 27/30, 27/34*

U.S. Cl. 428—149 10 Claims

1. A transparent, non-tacky sheet comprising a backing bearing on at least one major surface thereof an ink-receptive layer, capable of having images formed thereon by means of oil-based inks, said layer formed from a polymeric composition having a Hansen dispersion parameter of from about 10 to about 20 $J^{\frac{1}{2}}/cm^{3/2}$, a Hansen hydrogen bonding parameter of from about 8 to about 20 $J^{\frac{1}{2}}/cm^{3/2}$, and a Hansen dipole parameter of less than about 6 $J^{\frac{1}{2}}/cm^{3/2}$, said layer further having a Sheffield smoothness of at least about 30 as measured in accordance with TAPPI Useful Method 518 and a haze value of 20% or less, as measured in accordance with ASTM D1003-61 (reapproved 1977).

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4,713,281

## MULTIPLE-USE PRESSURE-SENSITIVE TRANSFER RECORDING MEDIA

Masami Shini, Itami, Japan, assignor to Fuji Kagakushi Kogyo Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 753,173, Jul. 9, 1985, Pat. No. 4,624,881. This application Sep. 10, 1986, Ser. No. 905,442

Claims priority, application Japan, Jul. 13, 1984, 59-146524; Sep. 18, 1984, 59-195374

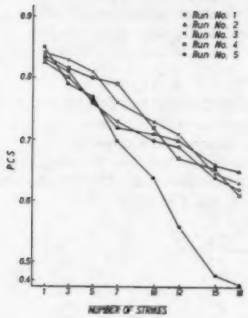
The portion of the term of this patent subsequent to Nov. 25, 2003, has been disclaimed.

Int. Cl.[4] B32B *3/26, 5/18;* B41J *31/02*

U.S. Cl. 428—207 5 Claims

1. A multiple-use pressure-sensitive transfer recording media which comprises a foundation and a finely porous resinous layer provided on the foundation, said porous layer comprising minute porous particles and a resinous binder material for bonding the porous particles to each other and containing a liquid ink paste substantially incompatible with the resinous

binder material, said liquid ink paste comprising a pigment, a liquid fatty acid and an oil-soluble dye dissolved in said liquid




fatty acid, and the weight ratio of said fatty acid to said dye being from 20:1 to 2:1.

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4,713,282

## FILMS FOR USE IN STRETCH-PACKAGING

Takao Yazaki; Masataka Noro, and Takashi Matsui, all of Mie,, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

PCT No. PCT/JP85/00555, § 371 Date Jun. 6, 1986, § 102(e) Date Jun. 6, 1986, PCT Pub. No. WO86/02043, PCT Pub. Date Apr. 10, 1986

PCT Filed Oct. 7, 1985, Ser. No. 878,959

Claims priority, application Japan, Oct. 8, 1984, 59-211125

Int. Cl.[4] B32B *27/28, 27/32;* B65D *65/40*

U.S. Cl. 428—216 14 Claims

1. A film for use in stretch-packaging, which comprises: an intermediate layer that has as its main component an α-olefin-series resin component containing a butene-1-series resin and at least two surface layers each containing as its main component an ethylene-vinyl acetate copolymer resin with a vinyl acetate content of 5 to 25 wt%, the surface layers being laminated over both surfaces of the intermediate layer.

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4,713,283

## REINFORCED COMPOSITE STRUCTURES

Frederic N. Cogswell, Guisborough, and Umakant Measuria, Great Ayton, both of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Jan. 15, 1985, Ser. No. 691,643

Claims priority, application United Kingdom, Jan. 27, 1984, 8402192; Mar. 6, 1984, 8405828

Int. Cl.[4] B32B *5/16*

U.S. Cl. 428—240 9 Claims

1. A reinforced composite structure comprising parallel, aligned continuous filaments extending along the maximum dimension of the structure, said filaments being present in a thermoplastic matrix polymer which intimately contacts substantially the whole of the surface of the filaments characterised in that the reinforcement of the structure comprises at least 30% by volume of filamentary reinforcing material and from 1% up to 30% by volume of particulate filler and that said intimate contact between matrix polymer and the surface of the filaments is achieved by the use of a molten mixture of thermoplastic polymer and plasticizer for the polymer.

4,713,284

## CERAMIC COATED LAMINATE AND PROCESS FOR PRODUCING THE SAME

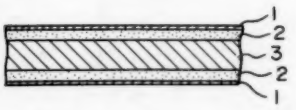
Hiroshi Hasegawa, Shimodate, and Mitsuhiro Inoue, Oyama, both of Japan, assignors to Hitachi Chemical Co., Ltd., Tokyo, Japan

Filed Dec. 19, 1986, Ser. No. 943,695

Claims priority, application Japan, Dec. 26, 1985, 60-295798; Feb. 12, 1986, 61-28698

Int. Cl.[4] B32B *7/00*

U.S. Cl. 428—246 15 Claims




4. A ceramic coated laminate according to claim 1, wherein a woven fabric in the woven fabric prepreg layer is a glass fiber.

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4,713,285

## HIGH TEMPERATURE FILTER MATERIAL

Max Klein, Schrewsbury, N.J., assignor to Frederick G. Crane, Jr., Dalton, Mass. and Max Klein, Trustee, Shrewsburg, N.J.

Filed May 2, 1986, Ser. No. 858,941

Int. Cl.[4] B32B *5/16;* B65B *1/24, 63/02*

U.S. Cl. 428—283 15 Claims

1. A high temperature filter material comprising a non-woven, glass fiber matrix, including mica particles, the majority of said particles being of a size below 40 microns, and polymer micro-bits produced from an expanded, thermoplastic polymer selected from the group of a styrene-polymer, a lower polyolefin, which is a polymer of an ethylenically unsaturated hydrocarbon monomer having from 2–6 carbon atoms, or copolymers or blends of said polymers, each said polymer being non-brittle in expanded form, or produced from a flexible foamed polyurethane, said polymer micro-bits being substantially completely free of intact cells of the expanded or foamed polymer from which they are produced, said matrix having uniformly distributed throughout a compatible binder system comprising an organic binding agent, which is insoluble in cold water and soluble in hot water and which retains its binding action upon cooling, for binding the points of contact of the fibrous and particulate components of said filter material and a film-forming siloxane polymer for aiding in the retention of the particulate components in said filter material.

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4,713,286

## PRINTED CIRCUIT BOARD DRILL AND METHOD OF MANUFACTURE

John A. Bunting; Louis M. Pope, both of Provo, Utah, and James L. Clark, Lubbock, Tex., assignors to Precorp, Inc., Niles, Ill.

Filed Oct. 31, 1985, Ser. No. 793,202

Int. Cl.[4] B22F *3/14, 7/08*

U.S. Cl. 428—323 12 Claims

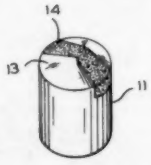
1. A composite sintered abrasive drill blank for formation into a rotary cutting tool comprising:

a drill blank of a first material, having a cylindrically shaped region with a top and bottom side,

said drill blank including a conically shaped point region of said first material, at said top side of said cylindrically shaped region;

one or more veins of sintered abrasive particulate extending longitudinally from the top of said conically shaped point region into said cylindrically shaped region of said drill blank, from the circumferential edge of said drill blank inwardly along at least a portion of the diameter of said drill blank;

said one or more veins of sintered abrasive particulate being directly and molecularly bonded to said first material of said drill blank without the utilization of intermediary carrier and substrate materials, so as to expose said sintered abrasive particulate only at both the top conical surface of said conically shaped point region and at the circumferential edges of said cylindrically shaped region, of said drill blank,




said one or more veins of sintered abrasive particulate retaining their position within said drill blank upon formation of said drill blank into said rotary cutting tool at which time the longitudinal edges of said one or more veins of sintered abrasive particulate are exposed to form cutting surface elements for said rotary cutting tool.

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**4,713,287**

## MAGNETIC RECORDING MEDIUM

**Yasuo Nishikawa; Tsutomu Okita; Yoshito Mukaida, all of Kanagawa; Masahiro Niinomi, Tokyo; Kenji Yanagihara, Tokyo, and Mitsuo Kimura, Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa and Japan Synthetic Rubber Co., Ltd., Tokyo, both of, Japan**

**Filed Sep. 25, 1984, Ser. No. 654,288**

**Claims priority, application Japan, Sep. 26, 1983, 58-176387**

**Int. Cl.[4] G11B *5/72***

**U.S. Cl. 428—336** **17 Claims**

1. A magnetic recording medium comprising a support having provided thereon a thin magnetic metal film, and a thin layer from 0.5 nm to 100 nm thick consisting essentially of at least one fluorinated polymer selected from 1,1-difluoroethylene polymer, 1,1,2-trifluoroethylene polymer and a copolymer of 1,1-diflurorethylene and 1,1,2-trifluoroethylene being provided on at least one of the surface of the thin magnetic metal film and on the surface of the support opposite to the thin magnetic metal film, wherein said fluorinated polymer is preformed, is then dissolved in an organic solvent or emulsified, and thereafter is applied to at least one of the surface of said thin magnetic metal and the surface of the support opposite to the thin magnetic film by coating and drying.

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**4,713,288**

## MAGNETIC RECORDING MEDIUM

**Yuuichi Kokaku; Makoto Kitoh, and Yoshinori Honda, all of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jun. 4, 1986, Ser. No. 910,141**

**Claims priority, application Japan, Jun. 17, 1985, 60-129820**

**Int. Cl.[4] G11B *5/72***

**U.S. Cl. 428—336** **22 Claims**

1. A magnetic recording medium comprising a magnetic layer of a ferromagnetic material, a layer of an organic material and a layer of carbon on a substrate in this order, wherein said layer of an organic material has a thickness of 0.001 to 0.5 $\mu$m and a bond strength of at least 10 Kg/cm$^2$.

22. A magnetic recording medium comprising a magnetic layer of a ferromagnetic material, a layer of an organic material and a layer of carbon which are formed on a substrate in this order, wherein said layer of organic material has a thickness of 0.001 to 0.5 $\mu$m and a bond strength of at least 10 Kg/cm$^2$, and wherein said layer of carbon is formed by any one method of sputtering a target material comprised of carbon; decomposing a hydrocarbon-containing gas in a plasma for deposition; ionization deposition wherein carbon is evaporated in a vacuum vessel, and the resultant vapor particles are ionized and accelerated in an electric field to impinge on the surface of the substrate to be treated; or evaporating carbon while irradiating the surface of the substrate to be treated with an energy beam such as an ion beam, laser, and electron rays.

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**4,713,289**

## WATER-DISPERSIBLE SYNTHETIC FIBER

**Donald A. Shiffler, Kinston, N.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 721,346, Apr. 9, 1985, abandoned. This application Mar. 27, 1986, Ser. No. 842,788**

**Int. Cl.[4] D02G *3/00***

**U.S. Cl. 428—361** **9 Claims**

1. Water-dispersible polyester fiber provided with a water-dispersing coating in sufficient amount to render the fiber water-dispersible, characterized in that the fibers are of cruciform cross-section.

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**4,713,290**

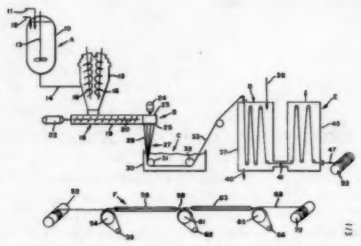
## HIGH STRENGTH AND MODULUS POLYVINYL ALCOHOL FIBERS AND METHOD OF THEIR PREPARATION

**Young D. Kwon, Morristown; Sheldon Kavesh, Whippany, and Dusan C. Prevorsek, Morristown, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.**

**Division of Ser. No. 569,818, Jan. 11, 1984, Pat. No. 4,599,267, which is a division of Ser. No. 432,044, Sep. 30, 1982, Pat. No. 4,440,711. This application Jan. 22, 1986, Ser. No. 821,374**

**Int. Cl.[4] D02G *3/00***

**U.S. Cl. 428—364** **29 Claims**



1. Polyvinyl alcohol fiber having a tenacity of at least 10 g/denier and a modulus of at least about 200 g/denier prepared by a process comprising the steps:

(a) forming a solution of a linear polyvinyl alcohol having a weight average molecular weight at least 500,000 in a first solvent at a first concentration between about 2 and about 15 weight percent polyvinyl alcohol,

(b) extruding said solution through an aperture, said solution being at a temperature no less than a first temperature upstream of the aperture and being substantially at the first concentration both upstream and downstream of said aperture,

(c) cooling the solution adjacent to and downstream of the

aperture to a second temperature below the temperature at which a rubbery gel is formed, forming a gel fiber containing first solvent of substantially indefinite length,

(d) extracting the gel fiber containing first solvent with a second, volatile solvent for a sufficient contact time to form a fibrous fiber structure containing second solvent, which gel is substantially free of first solvent and is of substantially free of first solvent and is of substantially indefinite length;

(e) drying the fibrous structure containing second solvent to form a xerogel fiber of substantially indefinite length free of first and second solvent; and

(f) stretching at least one of:

(i) the gel fiber containing the first solvent,

(ii) the fibrous fiber structure containing the second solvent and,

(iii) the xerogel, fiber, at a total stretch ratio sufficient to achieve a tenacity of at least about 10 g/denier and a modulus of at least about 200 g/denier.

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## 4,713,291
## FRAGRANT FIBER

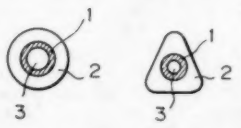
**Makoto Sasaki; Jun Yoshida; Yoshishige Shimizu; Kiyoshi Akazawa; Eiji Kishita, and Kaoru Hirata, all of Toyohashi, Japan, assignors to Mitsubishi Rayon Company Ltd., Tokyo, Japan**

**Filed Sep. 6, 1985, Ser. No. 773,038**

**Claims priority, application Japan, Sep. 6, 1984, 59-186842; Feb. 27, 1985, 60-38415; Feb. 27, 1985, 60-38416**

**Int. Cl.[4] D02B *3/00***

**U.S. Cl. 428—373** **7 Claims**




**1**. A fragrant sheath-core composite fiber having a cross-section comprising a sheath and a core including a hollow portion along the entire cross-section thereof, wherein an aromatic perfurme having a boiling point higher than 150° C. under normal pressure is incorporated and dispersed in an amount of 0.1 to 10.0% by weight in a thermoplastic polymer constituting the core, said polymer constituting the core being a polyethylene polymer in which at least 70 mole % of recurring units are ethylene recurring units, and the sheath being constituted by a polyethylene terephthalate polymer in which at least 95 mole % of recurring units are ethylene terephthalate recurring units, said aromatic perfume comprising an admixture of essential oils selected from the group consisting of (a) an admixture of lemon oil, bergamot oil, lavender oil, lemongrass oil, cedarwood oil and jasmine absolute, and (b) an admixture of α-pinene, cedarwood oil, abies oil, pine needle oil, orange oil and eucalyptus oil.

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## 4,713,292
## MULTILAYER COMPOSITE HOLLOW FIBERS AND METHOD OF MAKING SAME

**Tohru Takemura; Hajime Itoh; Jun Kamo, all of Hiroshima, and Haruhiko Yoshida, Yamaguchi, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan**

**Filed Jun. 26, 1986, Ser. No. 878,678**

**Claims priority, application Japan, Jun. 27, 1985, 60-141385**

**Int. Cl.[4] D02G *3/00***

**U.S. Cl. 428—373** **8 Claims**

**1**. A multilayer composite hollow fiber comprising at least one nonporous separating membrane layer (A) performing a separating function and two or more porous layers (B) performing a reinforcing function, said layer (A) and said layers (B) being alternately laminated so as to give a structure having inner and outer surfaces formed by said porous layers (B).

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## 4,713,293
## MAGNETIC RECORDING MEDIA

**Masao Asano; Ryosuke Isobe; Yasuhisa Yamauchi, and Hiroaki Yamagishi, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

**Filed Jul. 30, 1985, Ser. No. 760,406**

**Claims priority, application Japan, Aug. 7, 1984, 59-166280**

**Int. Cl.[4] G11B *5/712***

**U.S. Cl. 428—403** **13 Claims**

**1**. A magnetic recording medium comprising a magnetic recording layer and a support wherein said magnetic recording layer contains a magnetic metal powder, a fatty acid and an ester thereof, and wherein the surface of said magnetic powder is pre-treated with a surfactant, the total amount of said fatty acid and said ester being in the range of 1.5% to 7.5% by weight of said magnetic metal powder, and the weight ratio of said fatty acid to said ester being from 85/15 to 99/1.

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## 4,713,294
## FOUNDRY SHELL CORE AND MOLD COMPOSITION

**David R. Armbruster, Forest Park, and Calvin K. Johnson, Lockport, both of Ill., assignors to Acme Resin Corporation, Westchester, Ill.**

**Filed May 23, 1986, Ser. No. 866,438**

**Int. Cl.[4] B05D *7/00*; B44D *1/20*; B32B *5/16*; C08G *8/04***

**U.S. Cl. 428—404** **18 Claims**

**18**. A free flowing foundry shell sand core and mold composition consisting essentially of particualte matter coated with a curable phenolicfuran resin, containing substantially no hexamethylene tetramine, said phenolicfuran resin having a mole ratio of phenol to furfuryl alcohol of from about 0.1:1 to about 10:1.

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## 4,713,295
## METHOD OF MODIFYING THE WETTABILITY OF GLASS BEADS, GLASS BEADS POLYMERIC MATERIAL INCORPORATING SUCH GLASS BEADS, AND METHOD OF APPLYING REFLECTIVE MARKINGS TO A SURFACE

**Pierre Laroche, Nalinnes, Belgium, assignor to Glaverbel, Brussels, Belgium**

**Filed Mar. 26, 1986, Ser. No. 844,315**

**Claims priority, application United Kingdom, Mar. 28, 1985, 8508093**

**Int. Cl.[4] B05C *1/16*; B05D *7/00*; B32B *5/16*; C03C *17/00***

**U.S. Cl. 428—406** **21 Claims**

**9**. A glass bead coated with a mixture of substances comprising a first substance which if present alone would tend to make the bead hydrophobic while leaving it oleophilic and a second substance which if present alone would tend to make the bead both hydrophobic and oleophobic; said first and said second substance being present in a proportion effective to attain a desired degree of wettability or bonding to a medium with which said coated beads are to be admixed.

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## 4,713,296
## LAMINATE HAVING GOOD GAS BARRIER PROPERTIES WITH BARRIER LAYER OF MODIFIED ETHYLENE-VINYL ALCOHOL COPOLYMER

**Akimasa Aoyama; Takeshi Moritani; Kiyoshi Yonezu; Taichi Negi, all of Kurashiki, and Takuji Okaya, Nagaokakyo, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan**

**Filed Jun. 12, 1986, Ser. No. 873,413**

**Claims priority, application Japan, Jun. 29, 1985, 60-140909**

**Int. Cl.[4] B32B *27/32, 27/08*; B29C *47/00*; B65D *85/00***

**U.S. Cl. 428—412** **5 Claims**

**1**. A laminate having good gas barrier properties which comprises at least one barrier layer of modified ethylene-vinyl

alcohol copolymer and at least one layer of thermoplastic resin, said modified ethylene-vinyl alcohol copolymer being a saponified product of pyrrolidone ring containing ethylene-vinyl acetate copolymer, having a pyrrolidone ring-containing unit of 0.01 to 5 mol %, ethylene unit of 20 to 55 mol % and a degree of saponification of the vinyl acetate component of at least 98 mol %.

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4,713,297

## LAMELLAR MAGNETIC CORE UTILIZING LOW VISCOSITY EPOXY ADHESIVE

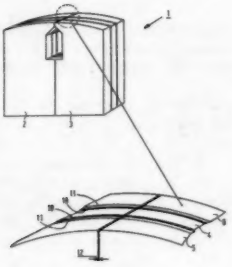
Johannes P. M. Verbunt, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 23, 1986, Ser. No. 854,970

Claims priority, application Netherlands, May 24, 1985, 8501491

Int. Cl.[4] B32B *27/38, 9/00;* G11B *5/147*

U.S. Cl. 428—414 3 Claims



1. A magnetic core comprising a first lamellar core part of amorphous, ferromagnetic material bonded by means of epoxy adhesive to a second lamellar core part or to a substrate by means of an epoxy adhesive having a viscosity of less than 1 Pa.s at room temperature, the opposing surfaces of said lamellar core parts or said substrate being coated with a thin film of an inorganic material selected from the group consisting of $TiO_2$, $SiO_2$, $Al_2O_3$ and $Si_3N_4$.

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4,713,298

## PRINTED CIRCUIT BOARDS HAVING IMPROVED ADHESION BETWEEN SOLDER MASK AND METAL

Paul L. K. Hung, Edison; Richard J. Radigan, Toms River, and David S. Rosen, Avenel, all of N.J., assignors to M&T Chemicals Inc., Woodbridge, N.J.

Division of Ser. No. 712,308, Mar. 15, 1985, Pat. No. 4,615,950. This application Apr. 17, 1986, Ser. No. 853,078

Int. Cl.[4] B32B *15/08;* G03C *1/495, 1/68*

U.S. Cl. 428—461 5 Claims

1. In a method of making a printed circuit board which includes a u.v. curable solder mask coating over a substrate having a metal, the step which enables the production of such boards having improved adhesion between mask and metal thereon, comprising:

applying a primer film to said substrate from an aqueous solution which includes 0.01 to 10% by weight of a carboxyl-containing polymer selected from the group consisting of a polyacrylic acid polymer, an ethylene- maleic acid copolymer or its half-acid ester, a butadiene-maleic acid copolymer or its half-acid ester, and a styrene-maleic acid copolymer or its half-acid ester.

4,713,299

## MODIFIED MELAMINE RESIN FOR USE IN DECORATIVE LAMINATES

Arthur R. Taylor, Billingham, England, and Dudley Wulfekotter, Cincinnati, Ohio, assignors to Formica Corporation, Wayne, N.J.

Filed Mar. 3, 1986, Ser. No. 835,567

Claims priority, application United Kingdom, Mar. 5, 1985, 8505602

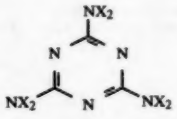
Int. Cl.[4] B32B *23/08, 27/42*

U.S. Cl. 428—526 10 Claims

1. A cellulosic paper sheet impregnated with from about 15% to about 80%, by weight, based on the weight of the paper sheet, of a composition comprising a blend of (1) from about 35% to about 98%, by weight, based on the total solids of the composition, of a melamine/formaldehyde resin having a ratio of formaldehyde to melamine of from about 1.1:1 to about 3:1, respectively, and (2) from about 2% to about 65%, by weight, based on the total solids of the composition, of a mixture of (A) a polyalkylene glycol having the formula

$$H(OC_xH_{2x})_nOH$$

wherein x is an integer of 2–4, inclusive, and n is an integer such that the glycol has a weight average molecular weight of from about 200 to about 1200 and, (B) an alkylated methylolmelamine having the formula



wherein each X is, individually, hydrogen or $CH_2OR$, R is hydrogen or an alkyl group of 1–4 carbon atoms, inclusive, at least 2 X's are $CH_2OR$, and at least one R is an alkyl group, the ratio of A:B ranging from about 2.5:1 to about 0.3:1, respectively, (C) from about 0% to about 3%, by weight, based on the total solids of the composition, of an acid catalyst, (D) from about 0% to about 0.5%, by weight, same basis, of a surfactant, (E) from about 0% to about 2.0%, by weight, same basis, of an abrasive material and (F) from about 0% to about 4.0%, by weight, same basis, of a flow promotor.

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4,713,300

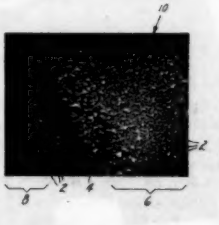
## GRADED REFRACTORY CERMET ARTICLE

Harold G. Sowman, Stillwater, and David R. Kaar, Minneapolis, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 13, 1985, Ser. No. 809,067

Int. Cl.[4] B05D *5/12, 7/00*

U.S. Cl. 428—547 19 Claims



1. A shaped, non-fused, cermet article comprising at least one continuous ceramic phase and containing at least one metal phase of discrete particles separated from each other, the ratio of ceramic/metal being controlled and gradually and continu-

ously varied over the depth of the article so as to provide an article wherein the density of metal is greatest in all the exterior surface portions and decreases towards the innermost portions.

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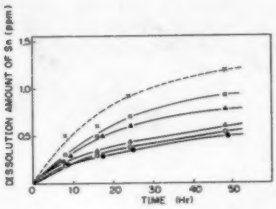
**4,713,301**

## SN-BASED MULTILAYER COATED STEEL STRIP HAVING IMPROVED CORROSION RESISTANCE, WELDABILITY AND LACQUERABILITY

**Seizun Higuchi; Tomonari Oga; Masao Ikeda, and Hirohumi Nakano, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan**

**Filed Jun. 27, 1986, Ser. No. 879,273**
**Claims priority, application Japan, Jul. 1, 1985, 60-144174**
**Int. Cl.[4] B32B *15/01***
**U.S. Cl. 428—628** **13 Claims**




1. A surface-treated steel strip for use as a container, having improved properties, characterized by having an Fe-Ni-P based, underlying coating layer, an Sn plated layer on the underlying coating layer, and a chromate coating layer on the Sn plated layer, wherein the Fe-Ni-P based underlying coating layer has a weight of from 10 to 300 mg/m$^2$ of a surface of the steel strip, and contains from 5 to 30% of Ni and from 0.1 to 10% of P.

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**4,713,302**

## SINTERED CERAMIC BODY

**Michiyasu Komatsu, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Continuation of Ser. No. 563,446, Dec. 20, 1983, abandoned.**
**This application Apr. 30, 1986, Ser. No. 869,820**
**Claims priority, application Japan, Dec. 22, 1982, 57-225417**
**Int. Cl.[4] B32B *15/04***
**U.S. Cl. 428—698** **10 Claims**

1. A sintered body of silicon nitride-based ceramics which contains at most 10% by weight of yttrium oxide and at most 10% by weight of aluminum oxide and which has a surface layer consisting essentially of yttrium silicate, cristobalite and silicon nitride.

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**4,713,303**

## FUEL CELL APPARATUS WITH RAPID START-UP

**Mohammad Farooque, Huntington, and Lawrence J. Novacco, Brookfield, both of Conn., assignors to Energy Research Corporation, Danbury, Conn.**

**Filed Feb. 24, 1987, Ser. No. 17,356**
**Int. Cl.[4] H01M *8/04***
**U.S. Cl. 429—26** **8 Claims**

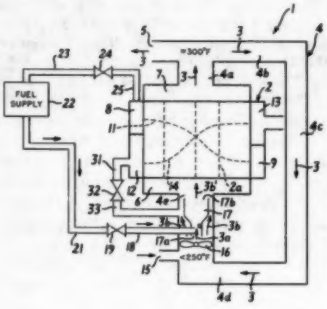
1. Apparatus comprising:

a fuel cell stack including passage means having entry and exit ends, said passage means carrying a gas through the stack from said entry to said exit end;

loop means for recirculating a portion of the gas leaving said exit end back to said entry end;

blower means within said loop for driving said recirculation;

burner means within said loop downstream of said blower means, said burner means being adapted to receive a portion of the gas in said loop and being further adapted to receive fuel from a fuel supply during start-up of said fuel cell stack;




and an entry port in said loop means disposed upstream of said blower, for replenishing gas to said loop.

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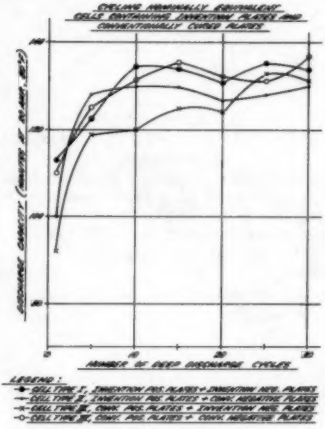
**4,713,304**

## METHOD OF PREPARING LEAD-ACID BATTERY PLATES AND LEAD-ACID BATTERIES CONTAINING PLATES SO PREPARED

**Purushothama Rao, Eagan, and Frederick L. Marsh, Fridley, both of Minn., assignors to GNB Incorporated, Mendota Heights, Minn.**

**Filed Jun. 18, 1986, Ser. No. 875,800**
**Int. Cl.[4] H01M *4/23***
**U.S. Cl. 429—136** **40 Claims**


CYCLING INDIVIDUALLY EQUIVALENT CELLS CONTAINING INVENTION PLATES AND CONVENTIONALLY CURED PLATES
DISCHARGE CAPACITY (MINUTES AT 20 AMPS. RATE)
NUMBER OF DEEP DISCHARGE CYCLES
LEGEND :

1. A method for preparing lead-acid battery positive and negative plates for use in lead-acid batteries, comprising: (a) providing battery grids, (b) applying wet leady oxide paste to the grids to form plates, and (c) initiating formation of the lead-acid battery plates while the plates contain more than about 5 wt. % free lead in the paste.

4,713,305

## WATER-FREE ORGANIC ELECTROLYTE

Ulrich von Alpen, Glashutten, Fed. Rep. of Germany, assignor to Varta Batterie A.G., Hanover, Fed. Rep. of Germany

Filed Mar. 31, 1987, Ser. No. 33,115

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1986, 3611123

Int. Cl.[4] H01M 6/16

U.S. Cl. 429—194 10 Claims

1. In a water-free organic electrolyte for galvanic cells with a negative light-metal electrode, which electrolyte contains at least one organic solvent with a CH bond activated by an —O—, =CO or =N-neighboring group, the improvement wherein a stabilizer substance is added to the electrolyte to prevent formation of polymeric peroxides or to destroy peroxides that are present.

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4,713,306

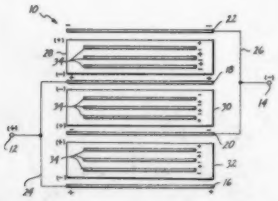
## BATTERY ELEMENT AND BATTERY INCORPORATING DOPED TIN OXIDE COATED SUBSTRATE

Naum Pinsky, Thousand Oaks, and Saulius A. Alkaitis, Venice, both of Calif., assignors to Ensci, Inc., Chatsworth, Calif.

Filed Mar. 24, 1986, Ser. No. 843,047

Int. Cl.[4] H01M 4/58, 6/48

U.S. Cl. 429—218 48 Claims



1. A battery element useful as at least a portion of the positive plates in a lead acid battery comprising an acid resistant substrate coated with electrically conductive doped tin oxide and a positive active electrode material provided that at least a portion of said coated substrate contacts said electrode material.

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4,713,307

## ORGANIC AZO PHOTOCONDUCTOR IMAGING MEMBERS

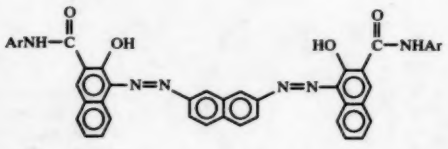
Kock-Yee Law, Fairport, and James M. Wescott, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 11, 1986, Ser. No. 851,066

Int. Cl.[4] G03G 5/06, 5/14

U.S. Cl. 430—57 44 Claims

1. An imaging member comprised of a supporting substrate, a photogenerating pigment containing an azo compound of the following formula



wherein Ar is an aromatic or substituted aromatic substituent; and a hole transport layer.

4,713,308

## ELECTROPHOTOGRAPHIC PHOTOSENSITIVE MEMBER USING MICROCRYSTALLINE SILICON

Shuji Yoshizawa, Tokyo; Wataru Mitani; Mariko Yamamoto, both of Yokohama; Akira Sanjoh, Aichi, and Tatsuya Ikezue, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Japan

Filed Jun. 23, 1986, Ser. No. 877,383

Claims priority, application Japan, Jun. 25, 1985, 60-138212; Jun. 25, 1985, 60-138215; Jun. 25, 1985, 60-138216; Jun. 25, 1985, 60-138217

Int. Cl.[4] G03G 5/14

U.S. Cl. 430—65 18 Claims

1. An electrophotographic photosensitive member comprising:

a conductive substrate;

a barrier layer provided on the conductive substrate; and

a photosensitive layer provided on the barrier layer, at least part of said photosensitive layer being comprised of microcrystalline silicon, the crystallinity of said microcrystalline silicon varying all the way through the thickness of the photosensitive layer.

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4,713,309

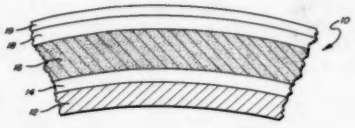
## ENHANCEMENT LAYER FOR POSITIVELY CHARGED ELECTROPHOTOGRAPHIC DEVICES AND METHOD FOR DECREASING CHARGE FATIGUE THROUGH THE USE OF SAID LAYER

Annette Johncock, Royal Oak, and Stephen J. Hudgens, Southfield, both of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Continuation-in-part of Ser. No. 769,106, Aug. 26, 1985, abandoned. This application Feb. 18, 1987, Ser. No. 16,157

Int. Cl.[4] G03G 5/082, 5/14

U.S. Cl. 430—65 19 Claims



1. An electrophotographic medium comprising:

an electrically conductive substrate;

a bottom layer overlying the substrate, the bottom layer adapted to block the free flow of charge carriers from the substrate;

a photoconductive layer overlying the bottom layer, the photoconductive layer adapted to discharge an electrostatic charge;

an enhancement layer overlying the photoconductive layer, the enhancement layer adapted to substantially reduce the number of charge carriers caught in deep mid-gap traps for preventing charge fatigue; said enhancement layer formed of silicon alloy material which is intentionally N-doped so as to move the Fermi level thereof to within about 0.8 to 0.5 eV of the conduction band to avoid said deep trapping and prevent image flow;

the semiconductor alloy material from which said enhancement layer is formed having the Fermi level thereof pinned; and

a top protective layer overlying the enhancement layer, said protective layer adapted to protect the photoconductive layer from ambient conditions.

## 4,713,310
## COLORED RESIN COMPOSITION

**Shinji Horie, Yokkaichi, Japan, assignor to Mitsubishi Petrochemical Company Limited, Tokyo, Japan**

**Filed Jan. 9, 1986, Ser. No. 817,438**
**Claims priority, application Japan, Jan. 9, 1985, 60-1770**
**Int. Cl.[4] C08L 67/02**
**U.S. Cl. 430—109** **9 Claims**

1. A colored resin composition comprising: a matrix phase comprised of a thermoplastic polyester and a thermoplastic modified polyester graft-copolymerized with styrene; a dispersed phase comprised of a thermoplastic styrene polymer, the dispersed phase being dispersed in the matrix phase and being separated in phase from the matrix phase; and a colorant having greater affinity for the thermoplastic styrene polymer of the dispersed phase than for at least one of the thermoplastic polyester and the thermoplastic modified polyester graft-copolymerized with styrene of the matrix phase so that substantially the entire amount of the colorant remains in the dispersed phase.

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## 4,713,311
## HOMOGENEOUS PHOTOCONDUCTIVE LAYER OF AMORPHOUS SILICON AND HYDROGEN

**Wilhelm Senske, Eschborn; Roland Herkert; Norbert Marschall, both of Frankfurt, and Karl-Heinrich Greeb, Dreieich, all of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs-GmbH, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Dec. 7, 1983, Ser. No. 559,178**
**Claims priority, application Fed. Rep. of Germany, Dec. 9, 1982, 3245500**
**Int. Cl.[4] G03G 5/082**
**U.S. Cl. 430—127** **7 Claims**

1. A process for producing an electrophotographic recording material having an electrically conductive substrate and an homogeneous photoconductive layer of amorphous silicon and hydrogen applied thereon, said process comprising

precipitating a photoconductive layer of silicon onto a substrate maintained at a temperature ranging from 100° to 300° C. by cathode sputtering in an atmosphere consisting of oxygen or an oxygen-releasing gas, hydrogen and argon, wherein the oxygen or oxygen-releasing gas is present in a proportion of about 1 ppm to 1 vol.% to said hydrogen and said argon gases.

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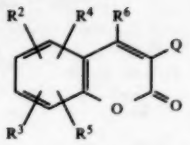
## 4,713,312
## IMAGING SYSTEM EMPLOYING PHOTOSENSITIVE MICROCAPSULES CONTAINING 3-SUBSTITUTED COUMARINS AND OTHER PHOTOBLEACHABLE SENSITIZERS

**Paul C. Adair; Gary F. Hillenbrand, and Paul D. Davis, all of Chillicothe, Ohio, assignors to The Mead Corporation, Dayton, Ohio**

**Continuation of Ser. No. 824,310, Jan. 30, 1986, abandoned, Continuation of Ser. No. 658,934, Oct. 9, 1984, abandoned. This application Dec. 10, 1986, Ser. No. 939,270**
**Int. Cl.[4] G03C 1/40, 1/00**
**U.S. Cl. 430—138** **8 Claims**

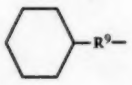
1. An imaging sheet useful in forming full color images comprising a support having on a surface thereof a layer containing three sets of microcapsules having distinct sensitivities and containing respectively cyan, magenta, and yellow image-forming agents; one of said three sets of microcapsules being blue light-sensitive and including in the internal phase thereof a free radical addition polymerizable material and a photoinitiator system including a photobleachable sensitizer, said sensitizer being bleachable upon exposure to radiation in the wavelength range of 390 to 500 nm and being represented by formula (I):



(I)

wherein Q is —Z—$R^1$, Z is carbonyl, $R_1$ is a hydroxyl group, an alkenyl group, an alkoxy group, an alkyl group, an aryl group, a carboxyclic group or a heterocyclic group;

$R^2$, $R^3$, $R^4$ and $R^5$ each independently represent hydrogen, an alkoxy group, a dialkylamino group, a halogen atom, an acyloxy group, a nitro group, a 5- or 6-membered heterocyclic group, or a group having the formula (II):



(II)

wherein $R^9$ is an alkylene group;

$R^6$ is hydrogen, an alkyl group or an aryl group;

and wherein two or three of $R^2$, $R^3$, $R^4$ and $R^5$ and the nuclear carbon atoms to which they are attached can together form a fused ring or fused ring system, each ring being a 5- or 6-membered ring.

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## 4,713,313
## PHOTOGRAPHIC SYSTEM AND NOVEL COMPOUNDS

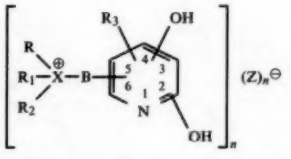
**James R. Bartels-Keith, deceased, late of Lexington, Mass. (by Dorothy F. Bartels-Keith, executrix); Anthony J. Puttick, Arlington, and Lloyd D. Taylor, Lexington, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

**Filed May 2, 1984, Ser. No. 606,350**
**Int. Cl.[4] G03C 5/54, 5/38**
**U.S. Cl. 430—251** **24 Claims**

10. A diffusion transfer photographic process comprising:

(1) reacting exposed silver halide of an imagewise exposed photosensitive silver halide emulsion layer carried on a support with a silver halide developing agent in aqueous aikaline solution;

(2) reacting unreduced silver halide of said photosensitive emulsion with a compound represented by the formula



wherein X is nitrogen or phosphorus; B is a divalent linking group; R and $R_2$ are independently selected from the group consisting of alkyl, substituted alkyl, cycloalkyl, aryl, aralkyl and alkaryl; $R_1$ is selected from the group consisting of alkyl, substituted alkyl, cycloalkyl, aryl, aralkyl, alkaryl and a divalent linking group; or at least two of R, $R_1$ and $R_2$, together with X, form a substituted or unsubstituted heterocyclic ring; $R_3$ is selected from the group consisting of hydrogen, alkyl, substituted alkyl, aryl, nitro and halogen; Z is a photographically acceptable anion; and n is 1 or 2; said compound being capable of reacting with silver halide to form a complex silver salt that is soluble in said alkaline solution;

(3) transferring said complex silver salt to a superposed image-receiving layer; and

(4) reducing said transferred complex silver salt to provide a silver image.

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**4,713,314**

**OPTICAL RECORDING MEDIUM**

**Kenryo Namba; Shigeru Asami; Toshiki Aoi; Kazuo Takahashi, all of Tokyo, and Akihiko Kuroiwa, Yokohama, all of Japan, assignors to TDK Corporation, Tokyo, Japan**

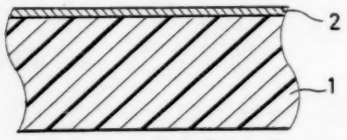
**PCT No. PCT/JP85/00253, § 371 Date Feb. 4, 1986, § 102(e) Date Feb. 4, 1986, PCT Pub. No. WO85/05078, PCT Pub. Date Nov. 21, 1985**

**PCT Filed May 2, 1985, Ser. No. 827,928**

**Claims priority, application Japan, May 7, 1984, 59-90748; May 8, 1984, 59-91567; Jun. 27, 1984, 59-132702**

**Int. Cl.[4] G03C 1/72; G11B 7/24**

**U.S. Cl. 430—270** **44 Claims**




1. An optical recording medium including a recording layer on a substrate, wherein said recording layer contains a mixture of a cyanine dye with a bonded compound of cyanine dye cation with quencher anion.

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**4,713,315**

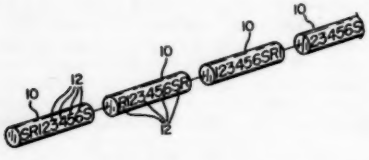
**WIRE TAG ETCHING SYSTEM**

**David V. Smith, 14014 NE. Salmon Creek Ave., Vancouver, Wash. 98686**

**Filed Dec. 9, 1986, Ser. No. 939,909**

**Int. Cl.[4] G03F 7/16**

**U.S. Cl. 430—326** **12 Claims**




1. A method of indelibly etching a plurality of identifying characters into a wire tag for macro-organisms, comprising:

coating the tag with photoresist;

exposing a defined portion of the coated tag to light, the defined portion corresponding to the characters;

removing the defined portion of the photoresist; and

etching the uncoated portion of the tag, whereby a pattern is etched which corresponds to the characters.

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**4,713,316**

**HEAT-DEVELOPABLE PHOTOGRAPHIC MATERIALS**

**Seiiti Kubodera; Toshinao Ukai, and Hisashi Okada, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

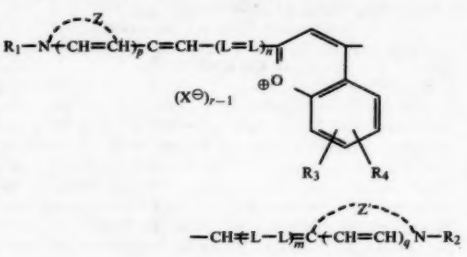
**Filed Dec. 4, 1985, Ser. No. 804,420**

**Claims priority, application Japan, Dec. 5, 1984, 59-257255**

**Int. Cl.[4] G03C 1/14, 5/00**

**U.S. Cl. 430—351** **21 Claims**

1. A heat-developable light-sensitive silver halide photographic material comprising a support having thereon at least one heat-developable photographic layer and comprising a silver halide emulsion, an alkali or alkali precursor and/or a mobile dye precursor, said photographic material containing an infra-red sensitizing dye represented by formula (I)



wherein

n and m each represents 0, 1, 2 or 3;

p and q each represents 0 or 1;

L represents a methine group or a substituted methine group;

$R_1$ and $R_2$ are same or different and each represents an unsubstituted or substituted alkyl group;

$R_3$ and $R_4$ are same or different and each represents a hydrogen atom, an alkyl group, an alkoxy group, a hydroxyl group, an unsubstituted or substituted amino group or a halogen atom; or said $R_3$ and $R_4$ form a condensed 6-membered ring;

Z and Z' are same or different and each represents a non-metallic atomic group necessary for forming a substituted or unsubstituted 5-membered or 6-membered ring, or substituted or unsubstituted 5-membered or 6-membered ring which is condensed with another ring;

$X^{\ominus}$ represents an anion;

r represents 1 or 2, and when the dye forms an internal salt, r is 1.

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**4,713,317**

**SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL**

**Shinichi Nakamura, Tokyo, and Keiji Ohbayashi, Hino, both of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

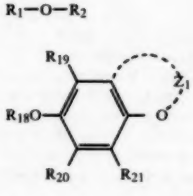
**Continuation of Ser. No. 736,559, May 21, 1985, abandoned. This application Apr. 16, 1986, Ser. No. 852,375**

**Claims priority, application Japan, May 22, 1984, 50-103273; Sep. 6, 1984, 59-187099**

**Int. Cl.[4] G03C 1/40, 7/32**

**U.S. Cl. 430—551** **14 Claims**

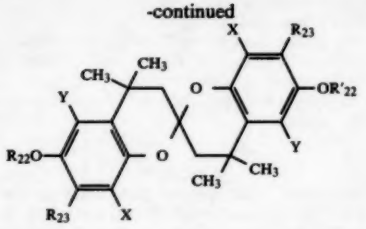
1. A silver halide color photographic material that has on a support at least one silver halide emulsion layer containing a non-diffusible coupler, wherein a compound of formula I) and a compound selected from the group consisting of he compounds of the following formulas (IV), (V), (VI) and VII) are incorporated:



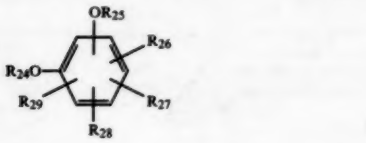
(I)

(IV)

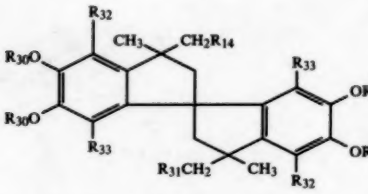
-continued



(V)



(VI)



(VII)

wherein $R_1$ and $R_2$ in formula (I) each represents an alkyl group, a cycloalkyl group or an alkenyl group; $R_{18}$ in formula (IV) is a hydrogen atom, an alkyl group, an aryl group, an alkenyl group, a cycloalkyl group, a heterocyclic group, a trialkylsilyl group, an alkanesulfonyl group, an arylsulfonyl group, —CO—V or —$SO_2$—V (wherein V is an alkyl group, an aryl group, an alkoxy group, an aryloxy group, an alkyloxycarbonyl group or an aryloxycarbonyl group); $R_{19}$, $R_{20}$ and $R_{21}$ are each a hydrogen atom, an alkyl group, an aryl group, an alkoxy group, an aryloxy group or an alkenyl group; and $Z_1$ is a group of non-metallic atoms necessary for forming a 5- or 6-membered ring, said non-metallic atomic group optionally having a substituent;

$R_{22}$ and $R'_{22}$ in formula (V) are each a hydrogen atom, an alkyl group, an alkenyl group, a cycloalkyl group, an aryl group, a heterocyclic group, —CO—V', —$SO_2$—V' or —CONH—V' (wherein V has the same meaning as defined for formula (IV)); $R_{23}$ is an alkyl group, an alkenyl group, an aryl group, an alkoxy group or an aryloxy group; when both $R_{22}$ or $R'_{22}$ and $R_{23}$ are each an alkyl group, R22 or $R'_{22}$ may be fused with $R_{23}$ to form a 5- to 7-membered ring; and X and Y are each a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, an alkenyl group, an aryl group or an aryloxy group;

$R_{24}$ and $R_{25}$ in formula (VI) are each an alkyl group, an alkenyl group, a cycloalkyl group, an aryl group, a trialkylsilyl group or a heterocyclic group; when —$OR_{25}$ is in the position ortho to —$OR_{24}$, $R_{24}$ may be fused with $R_{25}$ to form a 5- or 6-membered ring; and $R_{26}$, $R_{27}$, $R_{28}$ and $R_{29}$ are each a hydrogen atom, a halogen atom, an alkyl group, an alkenyl group, a cycloalkyl group, an aryl group, an acyl group, an acylamino group, an alkylamino group, an alkoxycarbonyl group or a sulfonamido group, provided that not all of $R_{26}$, $R_{27}$, $R_{28}$ and $R_{29}$ are hydrogen atoms at the same time; and

$R_{30}$ in formula (VII) is an alkyl group, an alkenyl group, an aryl group, a heterocyclic group, —$COR'_{33}$, —$SO_2R'_{33}$ or —$CONHR'_{33}$ (wherein $R'_{33}$ is an alkyl group, an alkenyl group or an aryl group), provided that when $R_{30}$ is an alkyl group, the adjacent $R_{30}$s may be fused together to form a 5- or 6membered ring; $R_{31}$ is a hydrogen atom, an alkyl group, an aryl group or an alkenyl group; and $R_{32}$ and $R_{33}$ are each a hydrogen atom, a halogen atom, an alkyl group or an alkenyl group.

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**4,713,318**

## CORE/SHELL SILVER HALIDE PHOTOGRAPHIC EMULSION AND METHOD FOR PRODUCTION THEREOF

**Tadao Sugimoto, and Toshiaki Hayakawa, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jan. 10, 1985, Ser. No. 690,356**

**Claims priority, application Japan, Jan. 12, 1984, 59-4017**

**The portion of the term of this patent subsequent to Sep. 30, 2003, has been disclaimed.**

**Int. Cl.[4] G03C *1/02***

**U.S. Cl. 430—567** **14 Claims**

1. A silver halide photographic emulsion comprising silver halide grains which are comprised of silver iodobromide and have a multilayer structure formed by a core and at least one covering layer, and an aspect ratio below 5, said silver halide grains being chemically sensitized and having a halogen composition such that the difference in average iodide content between adjacent layers, each of which has a substantially homogeneous iodide distribution, is not less than 35 mol %, wherein the iodide content in the outermost layer is not more than 40 mol % and in which the overall silver iodide content in said silver halide grains of the multilayer structure is not more than 10 mol %.

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**4,713,319**

## HEAT DEVELOPABLE PHOTOSENSITIVE MATERIAL

**Toshiaki Aono, and Hiroshi Hara, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jul. 23, 1985, Ser. No. 757,983**

**Claims priority, application Japan, Jul. 23, 1984, 59-152497**

**Int. Cl.[4] G03C *1/02***

**U.S. Cl. 430—567** **11 Claims**

1. A heat developable photosensitive material comprising a support, having a light-sensitive layer thereon wherein said light-sensitive layer comprises a light-sensitive silver halide, silver salt grains having a dissolution retarder absorbed thereto, a reducing agent, and a binder, wherein said dissolution retarder is selected from the group consisting of compounds having a mercapto group and compounds having a heterocyclic ring containing a NH group.

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**4,713,320**

## LOW METHIONINE GELATINO-PEPTIZER TABULAR GRAIN SILVER BROMIDE AND BROMOIODIDE EMULSIONS AND PROCESSES FOR THEIR PREPARATION

**Joe E. Maskasky, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Continuation of Ser. No. 811,133, Dec. 19, 1985, abandoned. This application Feb. 17, 1987, Ser. No. 15,270**

**Int. Cl.[4] G03C *1/02, 5/26***

**U.S. Cl. 430—567** **18 Claims**

1. A process for the precipitation of a thin tabular grain emulsion comprising

concurrently introducing into a reaction vessel silver, bromide, and, optionally, iodide ions to form tabular grains of less than 0.2 μm in thickness and

maintaining the tabular grains in suspension with a gelatino-peptizer,

characterized in that the gelatino-peptizer contains less than 30 micromoles of methionine per gram.

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**4,713,321**

**PROCESS FOR PREPARING SILVER HALIDE EMULSION UTILIZING A PHOTOGRAPHICALLY USEFUL ADDITIVE CAPABLE OF BEING DEACTIVATED AND A DEACTIVATING AGENT THEREFOR AND SILVER HALIDE PHOTOGRAPHIC MATERIAL PREPARED BY THE PROCESS**

**Hiroyuki Mifune; Tadao Shishido, and Yoshiaki Suzuki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**PCT No. PCT/JP85/00335, § 371 Date Feb. 14, 1986, § 102(e) Date Feb. 14, 1986, PCT Pub. No. WO86/00150, PCT Pub. Date Jan. 3, 1986**

**PCT Filed Jun. 14, 1985, Ser. No. 834,278**

**Claims priority, application Japan, Jun. 15, 1984, 59-122982**

**Int. Cl.[4] G03C** *1/02, 1/06*

**U.S. Cl. 430—569** **11 Claims**

1. A process for preparing a silver halide photographic emulsion utilizing a dye of the kind which can be adsorbed by or react with silver halide grains within a period from the silver halide grain forming time to just before the emulsion coating step, which further comprises using an oxidizing agent which has the ability to act on said dye and which is selected from the group consisting of hydrogen peroxide, adducts of hydrogen peroxide, peroxy acid salts, organic peroxides, oxidizing gases, and halogen releasing oxidizing compounds, therethrough to lower or to extinguish its function of absorption or reaction at the time when the function of said dye becomes substantially needless.

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**4,713,322**

**SILVER HALIDE PHOTOSENSITIVE MATERIAL**

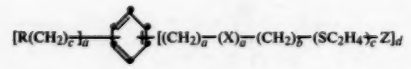
**Philip S. Bryan, and Arthur H. Herz, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Dec. 29, 1986, Ser. No. 947,454**

**Int. Cl.[4] G03C** *1/02, 1/06*

**U.S. Cl. 430—569** **17 Claims**

13. In a process for the preparation of a silver halide emulsion, the improvement which comprises adding, during preparation of said emulsion or prior to coating thereof on a support, from about 0.001 to about 10 g per mol of silver halide of a compound having the structural formula:



wherein

R is COOH;

X is sulfur or oxygen;

each a is independently 0 or 1;

b is 0, 1, 2 or 3;

each c is independently 0, 1 or 2;

d is from 2 to 6; and

Z is a group having the formula $-S(CH_2)_nCOOH$; $-S(CH_2)_nCH_2OH$; $-OCH_2CH_3$ or $-NHCOCH_2CH_2COOH$, where n is from 1 to 6,

with the proviso that said compound comprises more than 2 sulfur atoms.

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**4,713,323**

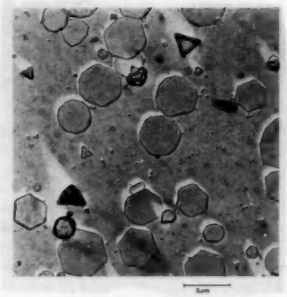
**CHLORIDE CONTAINING TABULAR GRAIN EMULSIONS AND PROCESSES FOR THEIR PREPARATION EMPLOYING A LOW METHIONINE GELATINO-PEPTIZER**

**Joe E. Maskasky, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Continuation of Ser. No. 811,132, Dec. 19, 1985, abandoned. This application Feb. 17, 1987, Ser. No. 15,405**

**Int. Cl.[4] G03C** *1/02, 1/76, 5/26*

**U.S. Cl. 430—569** **30 Claims**



1. A process of preparing a radiation sensitive high aspect ratio tabular grain emulsion, wherein tabular grains of less than 0.35 μm in thickness and an aspect ratio of greater than 8:1 account for greater than 50 percent of the total grain projected area, comprising

introducing silver ion into a dispersing medium containing

at least a 0.5 molar concentration of chloride ion and

a gelatino-peptizer formed of less than 30 micromoles of methionine per gram.

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**4,713,324**

**INVERTED LATENCY SPECIFIC BINDING ASSAY**

**John P. Fox, Ardsley; Eddie Hedaya, Hartsdale, both of N.Y., and Violet Lippman, Teaneck, N.J., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.**

**Filed Sep. 1, 1983, Ser. No. 528,496**

**Int. Cl.[4] C12Q** *1/00;* **G01N** *33/53*

**U.S. Cl. 435—4** **22 Claims**

1. A composition for determining a ligand in a sample, which composition comprises:

(a) a binding partner for said ligand;

(b) a detection system which has at least two components;

(c) a selective permeable vesicle having a surface bound ligand or ligand analog and a first component of said detection system therein;

(d) a substance which modifies vesicle permeability in response to binding of surface-bound ligand or ligand analog and the binding partner; and

(e) at least an additional component of said detection system which is reactive with said first component to produce a detectable response which is reduced when the vesicle is in the presence of the binding partner and vesicle modifying substance.

4,713,325

## HYBRIDOMAS PRODUCING MONOCLONAL ANTIBODIES SPECIFIC FOR FELV P27

**Hans Lutz, Ruedlinger, Switzerland, assignor to The Regents of the University of California, Berkeley, Calif.**

**Continuation of Ser. No. 503,643, Jun. 14, 1983, abandoned, which is a continuation of Ser. No. 219,603, Dec. 24, 1980, abandoned. This application Mar. 21, 1986, Ser. No. 842,749**

**Int. Cl.[4] C12Q** *1/70;* **G01N** *33/53, 33/577*

**U.S. Cl. 435—5** **7 Claims**

1. Murine hybridoma cells producing and secreting monoclonal antibodies specific for a determinant site of the p27 protein of feline leukemia virus, and capable of distinguishing the A, B, C, AB, and ABC strains of FeLV from murine leukemia virus (AKR strain).

5. A method according to claim 4, wherein said enzyme immunoassay is an enzyme linked immunosorbent assay.

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4,713,326

## COUPLING OF NUCLEIC ACIDS TO SOLID SUPPORT BY PHOTOCHEMICAL METHODS

**Nanibhushan Dattagupta, New Haven, and Donald M. Crothers, Northford, both of Conn., assignors to Molecular Diagnostics, Inc., West Haven, Conn.**

**Continuation-in-part of Ser. No. 511,064, Jul. 5, 1983, Pat. No. 4,542,102. This application May 18, 1984, Ser. No. 611,667**

**The portion of the term of this patent subsequent to Sep. 17, 2002, has been disclaimed.**

**Int. Cl.[4] G01N** *33/50*

**U.S. Cl. 435—6** **12 Claims**

7. An immobilized nucleic acid probe comprising (a) a nucleic acid, (b) a nucleic acid-binding ligand photochemically linked to the nucleic acid, and (c) a solid substrate chemically linked through a divalent radical to the nucleic acid-binding ligand (b).

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4,713,327

## DETERMINATION OF TOTAL CREATINE KINASE OR AN ISOENZYME WITH A MULTILAYER ANALYTICAL ELEMENT

**John B. Findlay, Rochester; Annie L. Wu, Penfield, and Gary E. Norton, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed May 1, 1985, Ser. No. 729,331**

**Int. Cl.[4] C12Q** *1/50;* **C12M** *1/38;* **G01N** *33/50*

**U.S. Cl. 435—17** **19 Claims**

1. A multilayer analytical element for the determination of total creatine kinase or a creatine kinase isoenyzme, said element comprising three or more layers and containing in one or more of said layers, a substrate for creatine kinase, said element also comprising a support having thereon,

a registration layer containing a binder material at a coverage of at least about 8 $g/m^2$ and an indicator composition which provides a detectable change in response to the reaction of said substrate with said creatine kinase or said isoenzyme,

a reagent layer, and

an isotropically porous spreading layer containing an activator for creatine kinase, said layers being in order from said support and in fluid contact.

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4,713,328

## MICROBIAL ENZYME ASSAYS

**Robert H. Yolken, 9120 Gorman Rd., Laurel, Md. 20810**

**Continuation of Ser. No. 307,323, Sep. 30, 1981, abandoned. This application Jan. 3, 1984, Ser. No. 567,152**

**Int. Cl.[4] C12Q** *1/34, 1/04, 1/06, 1/02*

**U.S. Cl. 435—18** **22 Claims**

1. A method of detecting a microbial infection in a mammal by measuring for the presence of beta-lactamase enzymes (E.C. 3.5.2.6) generated by the infecting microbes comprising:

(a) combining an internal body fluid sample taken from the mammal suspected of having a microbial infection with a penicillin substrate having a beta-lactam ring capable of being hydrolyzed by beta-lactamase enzymes under conditions sitable for beta-lactamase activity, wherein said substrate is $^{14}C$-benzylpenicillin;

(b) determining the presence of beta-lactamase enzyme in said sample by quantitating hydrolysis of said substrate by said enzyme using an ion exchange column to which the cleaved substrate binds; and

(c) comparing under similar conditions the results in step (b) with a normal predetermined standard for an uninfected mammal of the same species;

wherein appreciably greater amount of hydrolysis of said substrate in the sample as compared to the normal standard is indicative of a microbial infection.

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4,713,329

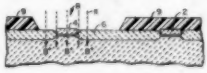
## WELL MASK FOR CMOS PROCESS

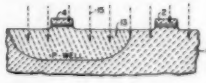
**Robert Fang, Cupertino; Jerry Wang, Los Altos Hills; Victor Liang, Capistrano Beach; Joseph Farb, Riverside, and Chung Hsu, Cupertino, all of Calif., assignors to Data General Corporation, Sunnyvale, Calif.**

**Filed Jul. 22, 1985, Ser. No. 757,331**

**Int. Cl.[4] H01L** *7/54, 21/265*

**U.S. Cl. 437—29** **15 Claims**





1. A method of forming complementary metal oxide semiconductor transistors with field regions fabricated without using additional field masks comprising, in the sequence provided, the steps of:

A. providing on a first conductivity type silicon substrate first and second spaced apart areas for said complementary metal oxide semiconductor transistors;

B. forming a masking member on said substrate protecting the first of said areas and exposing the second;

C. doping the second area with second conductivity type modifiers;

D. driving in said second conductivity type modifiers to form a well region;

E. further doping the second area with additional well dopant of said second conductivity type modifiers without increasing the size of said second area exposed by said masking member; and

F. fabricating complementary metal oxide semiconductor transistors in said first and second spaced apart areas.

11. A method of forming complementary metal oxide semiconductor transistors with field regions fabricated without using additional masking steps comprising, in the sequence provided, the steps of:

A. providing on an n-type silicon substrate first and second spaced apart areas;

B. selectively applying silicon nitride to said first and second areas;

C. applying a field oxide over portions of said silicon substrate;

D. providing a well mask to substantially cover the first of said areas but not the second of said areas;

E. doping the exposed second area with a p-type material;

F. etching portions of said field oxide in said second area;

G. forming a the p-well region by driving in said second conductivity type modifiers;

H. uniformly applying additional p-type material to the substrate which passes into the substrate in the p-well region but not in regions covered with field oxide and silicon nitride; and

I. fabricating complementary metal oxide semiconductor transistors in said first and second spaced apart areas.

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## 4,713,330

## VISUAL BIOASSAY FOR RHIZOBIUM COMPETITION VARIANTS

**McLoughlin, Thomas J., Cottage Grove, Wis., assignor to Lubrizol Genetics, Inc., Wickliffe, Ohio**

**Filed Dec. 23, 1985, Ser. No. 812,251**

**Int. Cl.[4] C12Q *1/04***

**U.S. Cl. 435—34** **22 Claims**

1. A method for separating a collection of one or more test Rhizobium strains into a Comp$^{above}$ collection and a Comp$^{below}$ collection, comprising in sequence the steps of:

(a) inoculating a first legume plant with a mixture of a Fix$^+$ test Rhizobium strain and a Fix$^-$ reference Rhizobium strain, wherein the test and reference strains are both Nod$^+$ on the plant, and the reference strain does not produce a phytotoxin;

(b) growing the plant for a time sufficient for an uninoculated plant of the same variety grown under the same conditions to be yellow due to nitrogen deficiency; and

(c) identifying the strain to be Comp$^{above}$ if the plant is green due to nitrogen sufficiency or to be Comp$^{below}$ if the plant is yellow due to nitrogen deficiency, wherein the Comp$^{above}$ and Comp$^{below}$ phenotypes are respectively more or less competitive than a Comp criterion, the criterion being measured relative to the reference strain;

whereby the test strain's Comp phenotype relative to the Comp criterion is determined.

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## 4,713,331

## MICROBIAL PRODUCTION OF A41030 ANTIBIOTICS

**Karl H. Michel, and Ralph E. Kastner, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Division of Ser. No. 637,096, Aug. 2, 1984, Pat. No. 4,559,323, which is a division of Ser. No. 443,496, Nov. 22, 1982, abandoned, which is a continuation-in-part of Ser. No. 361,301, Mar. 24, 1982, abandoned. This application Sep. 16, 1985, Ser. No. 776,541**

**Int. Cl.[4] C12P *21/04*; C12N *1/20*; C12R *1/465*; C07K *7/64***

**U.S. Cl. 435—68** **11 Claims**

1. A process for producing A41030 antibiotic complex containing A41030 factors A, B, C, D, E, F and G which comprises cultivating *Streptomyces virginiae* NRRL 15156, or an A41030-producing mutant thereof, in a culture medium containing assimilable sources of carbon, nitrogen and inorganic salts under submerged aerobic fermentation conditions until a recoverable mount of A41030 antibiotic complex is produced.

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## 4,713,332

## T CELL SPECIFIC CDNA CLONE

**Tak W. Mak, Toronto, Canada, assignor to The Ontario Cancer Institute, Toronto, Canada**

**Continuation-in-part of Ser. No. 570,694, Jan. 13, 1984. This application Feb. 6, 1984, Ser. No. 577,526**

**Int. Cl.[4] C12P *21/02, 19/34*; C12N *15/00*; C07H *15/12***

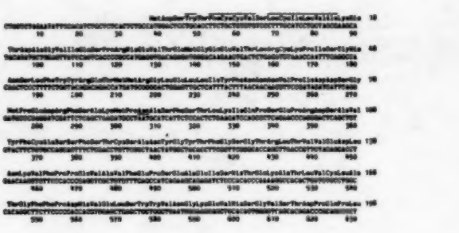
**U.S. Cl. 435—70** **24 Claims**

1. An isolated nucleic acid sequence encoding a polypeptide which is at least part of the beta chain of a human T cell antigen receptor comprising at least about 936 nucleotides.

2. A nucleic acid of claim 1, wherein the nucleic acid is DNA.

3. A nucleic acid of claim 2, wherein the nucleic acid is a cDNA.

13. A method of preparing the cDNA of claim 3 which comprises obtaining mRNA from a human T cell, preparing



cDNA complementary to the mRNA, inserting the cDNA into an appropriate cloning vehicle, introducing the cloning vehicle into a suitable host, culturing the resulting host under appropriate conditions permitting production of multiple copies of the cDNA, recovering the cDNA so produced and screening the cDNA to determine whether said cDNA is expressed only in T cells.

18. A cloning vehicle comprising the nucleic acid of claim 1.

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## 4,713,333

## IMMOBILIZATION OF BIOCATALYSTS ON GRANULAR DIATOMACEOUS EARTH

**John P. Chiang, Elkhart, and Oreste J. Lantero, Jr., Goshen, both of Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.**

**Filed Sep. 23, 1985, Ser. No. 779,053**

**Int. Cl.[4] C12P *19/20*; C12N *11/14***

**U.S. Cl. 435—96** **19 Claims**

9. An immobilized enzyme conjugate comprising porous, granular, diatomaceous earth having attached thereto the reaction product of a polyamine compound having pendant amine groups, an amine reactive material which is a multifunctional aldehyde, a multifunctional organic halide, a multifunctional anhydride, a multifunctional azo compound, a multifunctional isothiocyanate or a multifunctional isocyanate whose unreacted amine reactive groups have been reacted with free amine groups of enzyme or enzymes to bind it thereto.

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## 4,713,334

## PROCESS FOR THE SACCHARIFICATION OF CELLULOSES

**Shizu Fujishima, Ikeda; Fumiko Yaku, Suita, and Tetsuo Koshijima, Kyoto, all of Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan**

**Continuation of Ser. No. 586,948, Mar. 7, 1984, abandoned. This application Mar. 27, 1986, Ser. No. 843,809**

**Claims priority, application Japan, Mar. 18, 1983, 58-46707; May 20, 1983, 58-89480**

**Int. Cl.[4] C12P *19/14, 7/14*; C12N *9/42***

**U.S. Cl. 435—99** **6 Claims**

1. A process for the saccharification of celluloses, comprising degradatively decomposing a cellulosic material by cellulases in the absence of an alcohol to obtain a liquid portion containing saccharides and a solid matter containing cellulases; separating said liquid portion from said solid matter; and degradatively saccharifying additional cellulosic material with the use of said solid matter in an aqueous solution, an aqueous pH-buffered solution or an aqueous pH-buffered solution of polysaccharides or oligosaccharides.

## 4,713,335
## PROTEIN MODIFICATION TO PROVIDE ENZYME ACTIVITY

**Melvin H. Keyes, Sylvania, Ohio, assignor to Owens-Illinois Glass Container Inc., Toledo, Ohio**

**Continuation of Ser. No. 418,344, Sep. 15, 1982, abandoned. This application Mar. 21, 1983, Ser. No. 476,954**

**The portion of the term of this patent subsequent to Sep. 2, 2003, has been disclaimed.**

**Int. Cl.[4] C12N** *9/00, 9/14*

**U.S. Cl. 435—183** **28 Claims**

1. A process for chemically altering the substrate specificity of a native protein to produce an enzyme-like modified protein, comprising:

a. selecting an enzyme to be modeled;

b. grossly denaturing a native protein;

c. partially renaturing said grossly denatured native protein to produce a partially denatured protein;

d. contacting said partially denatured protein with an inhibitor for said model enzyme to form a partially denatured protein-model enzyme inhibitor complex; and

e. cross-linking said partially denatured protein in said protein-inhibitor complex.

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## 4,713,336
## GENE FOR LIGNIN DEGRADATION AND USES THEREOF

**Vadake R. Srinivasan; Jeffrey W. Cary; Younghae Chon, and Kenneth E. Narva, all of Baton Rouge, La., assignors to Research Corporation Technologies, Inc., Tucson, Ariz.**

**Filed Sep. 27, 1984, Ser. No. 655,193**

**Int. Cl.[4] C12P** *7/02;* **C12N** *9/14, 15/00;* **C07H** *15/12*

**U.S. Cl. 435—155** **22 Claims**

2. A vector comprising a DNA segment which codes for an aryl etherase protein, the segment being oriented within said vector such that in a host said segment is expressed to produce a non-native aryl etherase protein said segment being derived from a microorganism having all the identifying characteristic of ATCC 39873 or mutants thereof.

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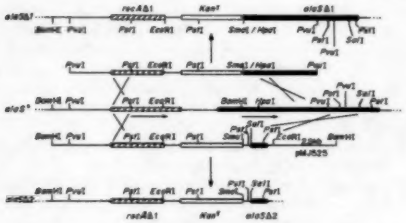
## 4,713,337
## METHOD FOR DELETION OF A GENE FROM A BACTERIA

**Maria Jasin, Ft. Lauderdale, Fla., and Paul R. Schimmel, Lexington, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Filed Jan. 3, 1985, Ser. No. 688,612**

**Int. Cl.[4] C12N** *15/00*

**U.S. Cl. 435—172.3** **11 Claims**




1. A method for deletion of any gene from an cell with RecA+ phenotype which comprises;

(a) constructing a linear DNA fragment wherein the fragment has sequences homologous to regions separated by a sequence including nucleotides encoding the gene to be deleted on the cell chremosome, said fragment being of a length and extend of homology as required for binding between the chromosome and said fragment;

(b) placing a second nucleotide sequence between the homologous sequences in the DNA fragment wherein insertion of the second sequence into the cell chromosome in place of the gene to be deleted and expression of said inserted gene results in a detectable pheno-type;

(c) introducing the linear DNA fragment into the cell strain;

(d) selecting for a double reciprocal recombination mediated by the RecA gene by culturing the cells containing the linear DNA under conditions wherein the phenotype encoded by the second nucleotide sequence is detected and cells with a double reciprocal recombination express the detectable phenotype; and

(e) immediately converting the cells from RecA+ to Reca—

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## 4,713,338
## POROUS SPHERICAL GLASS FILTRATING BEADS AND METHOD FOR THE MANUFACTURING THEREOF

**Carlos J. R. Gonzalez Oliver, Geneva; Olivier De Pous, Chene-Bougeries, and Michel Schneider, Troinex, all of Switzerland, assignors to Battelle Memorial Institute, Geneva, Switzerland**

**Filed Aug. 6, 1986, Ser. No. 893,922**

**Claims priority, application European Pat. Off., Aug. 12, 1985, 85810368.2**

**Int. Cl.[4] C12N** *11/14;* **C03C** *11/00*

**U.S. Cl. 435—176** **21 Claims**

1. Porous mineral or glass filtrating beads of substantially uniform spherical shape characterized in having a homogeneous metaloxane structure consisting essentially of silicon oxide and zirconium oxide and optionally at least another metal oxide selected from titanium and aluminium oxides.

21. A method for immobilizing enzymes on the beads of claim 1, comprising activating the beads surface with a compound bearing a ligand for binding enzymes, such as an alkoxysilane carrying functions like OH, SH, $NH_2$, NCO oxirane and others, contacting the activated beads with selected enzyme preparations and isolating said beads after binding of the enzymes to the beads is effective.

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## 4,713,339
## POLYCISTRONIC EXPRESSION VECTOR CONSTRUCTION

**Arthur D. Levinson, Burlingame, and Christian C. Simonsen, San Jose, both of Calif., assignors to Genentech, Inc., South San Francisco, Calif.**

**Filed Jan. 19, 1983, Ser. No. 459,152**

**Int. Cl.[4] C12N** *5/00, 15/00, 5/02, 1/00;* **C12P** *21/00, 21/02, 21/04, 19/34;* **C07H** *21/04*

**U.S. Cl. 435—240.2** **8 Claims**

1. An expression vector capable of expressing in a vertebrate host cell culture a desired protein and a secondary protein, which vector comprises a DNA sequence encoding for a desired protein and a DNA sequence encoding for a secondary protein wherein both said DNA sequences are operably linked to the same promoter sequence and separated by translational stop and start codons.

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## 4,713,340
## BIODEGRADATION OF PENTACHLOROPHENOL

**Ronald L. Crawford, Mound, Minn., assignor to Regents of the University of Minnesota, St. Paul, Minn.**

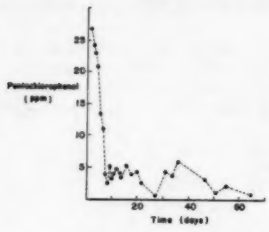
**Filed Jun. 13, 1984, Ser. No. 620,231**

**Int. Cl.[4] C12N** *1/20;* **C12R** *1/20*

**U.S. Cl. 435—253** **10 Claims**

1. A method of detoxifying pentachlorophenol (PCP) by microbial degradation comprising culturing a PCP-degrading bacterium in an aqueous medium comprising dissolved PCP,

wherein said bacterium is a member of the genus Flavobacterium, and is capable of sustained growth in medium concentrations of PCP between 250 mg/l and 400 mg/l as its sole source of carbon and energy.

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**4,713,341**

## STARTER CULTURES OF IMPROVED ACTIVITY FOR DAIRY PRODUCTS AND PROCESS OF MAKING SAME

**Robert R. Bily, Box 3637, San Jose, Calif. 95156**

**Division of Ser. No. 532,673, Sep. 16, 1983, Pat. No. 4,544,636, which is a continuation-in-part of Ser. No. 507,928, Jun. 27, 1983, abandoned. This application Aug. 15, 1985, Ser. No. 765,694**

**The portion of the term of this patent subsequent to Oct. 1, 2002, has been disclaimed.**

**Int. Cl.[4] C12N** *1/20, 1/38;* **A23C** *9/13*

**U.S. Cl. 435—253** **2 Claims**

1. A method of making bacterial cultures for use in producing a lactic food product comprising the steps of combining acid-producing bacteria with sterile culture media, further combining at least 0.01% lecithin by weight of the sterile culture media to the acid-producing bacteria and sterile culture media, then incubating the mixture of sterile culture media, acid-producing bacteria and lecithin to produce an active, viable bacteria culture of enhanced activity that may be added to a lactic medium for producing a foot product.

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**4,713,342**

## NOVEL ISOLATE OF TRICHODERMA, FUNGICIDAL COMPOSITIONS CONTAINING SAID ISOLATE AND USE THEREOF

**Ilan Chet; Alex Sivan, both of Ness Ziona, and Yigal Elad, Kibbutz Netzer Sireni, all of Israel, assignors to Yissum Research Development Co. of the Hebrew University of Jerusalem, Jerusalem, Israel**

**Filed Mar. 13, 1984, Ser. No. 588,950**

**Claims priority, application Israel, Mar. 15, 1983, 68129**

**Int. Cl.[4] C12N** *1/14;* **A61K** *35/70;* **A01N** *63/04*

**U.S. Cl. 435—254** **15 Claims**

1. A biologically pure, stable culture of a strain of a mycoparasite of the species *Trichoderma harzianum* designated *Trichoderma harzianum* Rifai T-315 (ATCC No. 20671) or a mutant derived therefrom useful as a biological control agent.

8. A biocontrol composition comprising an effective amount of the culture of claim 1 and a suitable agronomically acceptable carrier.

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**4,713,343**

## BIODEGRADATION OF HALOGENATED ALIPHATIC HYDROCARBONS

**John T. Wilson, Jr., and Barbara H. Wilson, both of Ada, Okla., assignors to The United States of America as represented by the Administrator of the U.S. Environmental Protection Agency, Wahington, D.C.**

**Filed Aug. 29, 1985, Ser. No. 770,445**

**Int. Cl.[4] C02F** *3/02, 3/34;* **C12N** *1/32, 1/26*

**U.S. Cl. 435—264** **10 Claims**

1. A process for the treatment of water which contains halogenated aliphatic hydrocarbons to aerobically degrade said halogenated aliphatic hydrocarbons, said halogenated aliphatic hydrocarbons being one or more members selected from the group consisting of 1,1,2-trichloroethane, 1,1-dichloroethane, 1,2-dichloroethane, trichloroethylene, cis-1,2-di-chloroethylene, trans-1,2-dichloroethylene, 1,2-dibromoethane, and vinyl chloride, the process comprising treating the water with a microorganism in the presence of a lower molecular weight alkane containing 1 to 4 carbon atoms, and oxygen, the microorganism comprising bacteria that can aerobically degrade low molecular weight alkanes by beginning their attack with the action of a monooxygenase to produce the corresponding alcohol, the bacteria acting to degrade said halogenated aliphatic hydrocarbons to form products comprising carbon dioxide and water.

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**4,713,344**

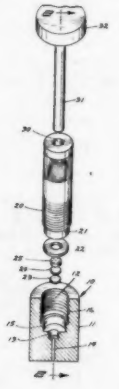
## HAND OPERATED PRESS FOR TISSUE EXTRACTION

**Albert H. Markhart, III, St. Paul, Minn., assignor to Regents of the University of Minnesota, Minneapolis, Minn.**

**Filed Jul. 11, 1984, Ser. No. 629,584**

**Int. Cl.[4] C12M** *1/00*

**U.S. Cl. 435—287** **12 Claims**



1. A press assembly for extracting and collecting usable samples of liquids from the cells of biological tissue for analysis comprising a housing, a chamber defined in said housing, said chamber having a central axis and an input end for receiving tissue to be pressed and including a subchamber section at an end of said housing opposite from the input end, the subchamber section having an end surface, a discharge passageway having a cross section size substantially smaller than the end surface, the discharge passageway being open through the end surface, and a pair of filter discs of substantially the same size as the end surface supported on the end surface, one on top of the other;

a screen member supported on the filter discs in the subchamber leading from said subchamber;

a barrel member threadably mounted in said housing, said barrel member having a bore coaxial with said subchamber and opening to said screen member, said bore being of substantially smaller diameter than the outer size of the barrel and substantially longer than its diameter; and

a plunger means slidably mounted in said bore, said plunger member including a head end of size to be useful for gripping by an operator to push the plunger member through the bore and to exert a pressure on material placed in the bore against said screen member, a first of said filter disks being next to the screen member on a side of the screen member opposite the bore for collecting debris passing through said screen member, liquids forced from tissue in the bore by operation of the plunger mem-

ber passing through the first filter disk for collection on the second filter disk for analysis.

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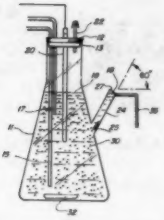
**4,713,345**

## FERMENTATION METHODS AND APPARATUS

**Steven L. Ramsden, Muscatine, Iowa, assignor to Grain Processing Corporation, Muscatine, Iowa**

**Filed Jul. 29, 1985, Ser. No. 760,288**
**Int. Cl.[4] C12M *1/02***
**U.S. Cl. 435—305** **7 Claims**



1. A method of conducting a continuous fermentation reaction which comprises introducing into a fermentation vessel a flocculating microorganism and a fermentable medium, permitting fermentation to occur, and continually withdrawing fermented broth from the vessel through an effluent discharge conduit communicating with the interior of said vessel whereby flocculated microorganism cells separate by sedimentation from the fermentation broth and are retained in the fermentation vessel, said conduit having a volume substantially less than the total working volume of said vessel and being disposed at an angle of at least 60° but less than 90° from the horizontal, and having the inlet opening thereof disposed at an angle not exceeding 90° from the horizontal.

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**4,713,346**

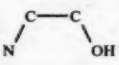
## FORMATION OF ANALYZABLE BORON CONTAINING ADDUCTS

**Paul M. Gallop; Edward Henson, both of Chestnut Hill, Mass., and Rudolf Flückiger, Basel, Switzerland, assignors to The Children's Medical Center Corporation, Boston, Mass.**

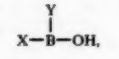
**Filed Feb. 3, 1986, Ser. No. 825,619**
**Int. Cl.[4] G01N *24/00, 30/00, 33/00***
**U.S. Cl. 436—86** **29 Claims**

1. A method of forming and analyzing analyzable adducts in a mixture of compounds, wherein the method comprises

contacting a mixture containing one or more compounds containing the functionality



with a boron reagent such that the boron reagent reacts with said one or more compounds to form analyzable adducts, wherein —OH is either a hydroxy or the —OH portion of a carboxyl group, and N is part of an amino group, an imino group, or an aromatic heterocycle, and the boron reagent has the formula of either



where each X and Y is, independently, an alkyl group of 12 or fewer carbons or an aryl group of 6–20 carbons; or $BZ_3$, where each Z is, independently, an alkyl group of 12 or fewer carbons, or an aryl group of 6–20 carbons; and analyzing said analyzable adducts either by a chromatographic technique or by mass spectroscopy.

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**4,713,347**

## MEASUREMENT OF LIGAND/ANTI-LIGAND INTERACTIONS USING BULK CONDUCTANCE

**David H. Mitchell, and Ralph M. Mitchell, both of Pacific Palisades, Calif., assignors to Sensor Diagnostics, Inc., Irvine, Calif.**

**Filed Jan. 14, 1985, Ser. No. 691,271**
**Int. Cl.[4] G01N *33/566, 27/26, 27/02, 33/544***
**U.S. Cl. 436—501** **85 Claims**

1. A method for determining the presence of a ligand in a fluid sample comprising:

(a) localizing antiligand which interacts with said ligand in at least one predetermined region, said predetermined region being at least partially contained within a test volume;

(b) exposing said predetermined region to said fluid sample; and

(c) measuring the bulk conductance of said test volume to determine the occurrence of ligand-antiligand interaction in said predetermined region by detecting changes in the bulk conductance of said test volume due to ligand-antiligand interaction in said predetermined region.

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**4,713,348**

## FLUORESCENT MULTIPARAMETER PARTICLE ANALYSIS

**Edwin F. Ullman, Atherton, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.**

**Continuation of Ser. No. 482,124, Apr. 5, 1983, Pat. No. 4,584,277. This application Oct. 22, 1985, Ser. No. 790,291**
**The portion of the term of this patent subsequent to Apr. 22, 2003, has been disclaimed.**
**Int. Cl.[4] G01N *33/566, 33/554, 33/544***
**U.S. Cl. 436—501** **14 Claims**

1. A method for determining a plurality of blood typing parameters, said parameters being epitopic sites and binding sites of specific binding members ($SBM_1$, $SBM_2$, . . . $SBM_m$), said binding members being ligands and reciprocal receptors respectively, wherein at least one parameter containing specific binding member or its reciprocal specific binding member is bound to a particle (SBM-P or RSBM-P),

said method involving at least one fluorescent label bound to a specific bindng member (SBM-F) and at least one particle (P), different fluorescent labels and different particles being distinguishable by spectroscopic characteristics, which are emission, absorption and light scattering;

said method comprising:

combining in a liquid medium,

(a) a blood sample having at least two blood typing parameters to be measured;

(b) for parameter containing specific bindng members bound to a particle ($SBM_1$-$P_1$, $SBM_2$-$P_2$, . . . $SBM_m$-$P_m$), fluorescent labeled specific binding member reciprocal to said specific binding member bound to said particle ($RSBM_1$-$F_1$, $RSBM_2$-$F_2$, . . . $RSBM_m$-$F_m$);

(c) for parameter containing specific binding members not bound to a particle ($SBM_1$, $SBM_2$, . . . $SBM_m$), (1) a particle bound to a specific binding member reciprocal to said parameter containing specific binding member ($RSBM_1$-$P_1$, $RSBM_2$-$P_2$, . . . $RSBM_m$-$P_m$) and (2) a fluorescent labeled specific binding member analogous to said parameter containing specific binding member ($SBM_1$-$F_1$, $SBM_1$-$F_1$ . . . $SBM_m$-$F_m$);

wherein the number of different particles ($P_m$) and fluorescent labels ($F_m$) are chosen to give signals (n) that distinguish each parameter in said sample and wherein sequential additions and sequential measurements may be made or simultaneous additions and simultaneous measurements may be made, and wherein n signals can distinguish $2^n-1$

parameters and wherein reciprocal binding members bind with each other;

irradiating at least a portion of said medium with light, wherein said medium is continuous and said particles are suspended in said continuous medium, and determining populations of particles having electromagnetic signals differing from threshold values; and

relating said populations to the presence of said parameters in said sample.

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**4,713,349**

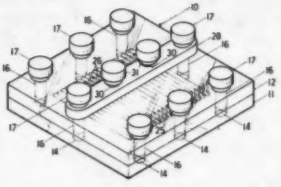
## TEMPLET FOR SIMULTANEOUS SCREENING OF SEVERAL ANTIBODIES AND METHOD OF USING THE SAME

**Andrew E. Levin, Cambridge, Mass., assignor to Wisconsin Alumni Research Foundation, Madison, Wis.**

**Filed Feb. 25, 1985, Ser. No. 705,094**

**Int. Cl.[4] B01L** *9/00*; **G01N** *33/543, 33/548, 33/559*

**U.S. Cl. 436—515** **18 Claims**



1. A templet for use in screening antibodies immobilized on a carrier sheet, comprising:

(a) a lower plate having a flat central area on its top surface size to receive a carrier sheet to be laid thereon;

(b) an upper plate having a flat central area on its bottom surface with a plurality of parallel channels formed therein;

(c) means for holding the upper plate tightly against the lower plate at peripheral areas outside of the central areas of the upper and lower plates where the carrier sheet is to be laid; and

(d) means for applying pressure to the upper plate at a position above the parallel channels in the upper plate whereby a carrier sheet engaged between the upper and lower plates will be tightly engaged at the area of the parallel channels, wherein the means for applying pressure to the upper plate includes a bridge bar engaged to at least one of the plates at peripheral positions on either side of the central area of the plates and extending over the parallel channels, and wherein the bridge bar has holes therein at the peripheral ends thereof and including threaded holding screws adapted to pass through the holes in the bridge bar and through corresponding holes in the upper plate and into threaded engagement with threaded holes in the lower plate to firmly hold the bridge bar to the upper plate, and wherein at least one pressure screw is threadingly engaged to a threaded hole in the bridge bar in position to be turned to apply pressure to the area of the top surface of the upper plate above the parallel channels.

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**4,713,350**

## HYDROPHILIC ASSAY REAGENT CONTAINING ONE MEMBER OF SPECIFIC BINDING PAIR

**Richard C. Siegel, Yorktown Heights; Christina S. Marx, Peekskill; Bartholomew Hargitay, White Pains, and Neil Wotherspoon, New York, all of N.Y., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.**

**Filed Oct. 24, 1983, Ser. No. 544,749**

**Int. Cl.[4] G01N** *33/546, 33/545, 33/543, 33/549*

**U.S. Cl. 436—533** **20 Claims**

1. A hydrophilic specific binding assay reagent which is prepared by a process comprising the steps of reacting a partner of a specific binding pair and at least one hydrophilic moiety with haloalkyl moieties present on the surface of a solid phase thereby covalently coupling said partner of a specific binding pair and said at least one hydrophilic moiety to said solid phase to create a substantially complete hydrophilic coating thereon, said at least one hydrophilic moiety including at least one protein and at least one non-proteinaceous amine to which said solid phase is substantially impermeable and recovering the reagent so prepared from any unreacted binding partner.

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**4,713,351**

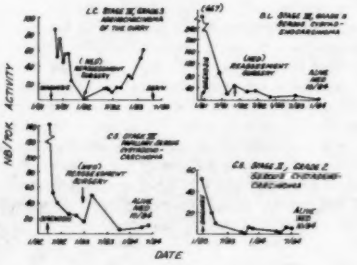
## MONOCLONAL ANTIBODY DIRECTED TO AN ANTIGEN DERIVED FROM HUMAN OVARIAN TUMORS AND A RADIOIMMUNOASSAY USING THE ANTIBODY

**Suzanne Knauf, Fairport, N.Y., assignor to The University of Rochester, Rochester, N.Y.**

**Continuation-in-part of Ser. No. 461,770, Jan. 28, 1983, Pat. No. 4,584,278, which is a continuation-in-part of Ser. No. 360,238, Mar. 19, 1982, abandoned. This application Jan. 9, 1986, Ser. No. 817,317**

**Int. Cl.[4] G01N** *33/536*

**U.S. Cl. 436—542** **4 Claims**




1. An improved radioimmunoassay, the NB12123 assay, to detect the presence of an ovarian tumor specific antigen, NB/70K, and the amount of NB/70K present, comprising tne steps of isolating Fraction OCC, OCA, OCB or OCD or NB/70K or serum, adding said isolate to a dilution of NB12123 in PBS containing 2% normal rabbit serum in a container, allowing sufficient time for said monoclonal antibody to react with said isolate, after said time has expired adding a radioiodinated NB/70K to said container, allowing a sufficient time for said radioiodinated NB/70K to react with a complex of monoclonal antibody and isolate, adding a mixture of *Staphylococcus aureus* of the Cowan I strain bearing protein A, 2.5% (v/v), and raboit anti-mouse globulin coupled to *Staphylococcus aureus* of the Cowan I strain bearing protein A, 5% (v/v), in the Triton-EDTA buffer to said container, centrifuging the container, decanting the supernatant and counting the radioactivity of the resulting pellet.

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**4,713,352**

## MONOCLONAL ANTIBODY PANEL FOR EARLY DIAGNOSIS AND THERAPY OF RENAL CARCINOMA

**Neil H. Bander; Willet F. Whitmore, and Lloyd J. Old, all of New York, N.Y., assignors to Sloan-Kettering Institute for Cancer Reseach, New York, N.Y.**

**Continuation-in-part of Ser. No. 297,814, Aug. 31, 1981, Pat. No. 4,650,765. This application May 4, 1984, Ser. No. 607,168**

**Int. Cl.[4] G01N** *33/53, 33/566*

**U.S. Cl. 436—548** **5 Claims**

1. Monoclonal antibody panel derived from human renal carcinoma or normal epithelial antigen useful for diagnosing renal cancers in humans by recognizing with overlapping

reactivity a site of origin of most renal carcinomas comprising the distal end of the renal proximal tubule (pars recta) and adjacent portion thereto of the Loop of Henle and wherein the panel consists of monoclonal antibody $S_4$ (HB 8541), $S_{23}$ (HB 8540), $F_{23}$ (HB 8231), $S_{27}$ (HB 8428) and $F_{31}$ (HB 8548).

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## 4,713,353
## METHOD OF PRODUCING A TRANSPARENT PHOTOCATHODE

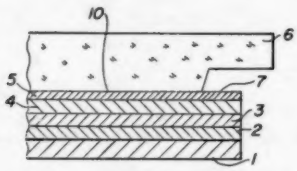
**Rudolf Förster, Tomerdingen; Suso Weber, Langenau, and Hans-Jürgen Pyka, Nersingen, all of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs GmbH, Fed. Rep. of Germany**

**Filed Jul. 3, 1986, Ser. No. 881,967**

**Claims priority, application Fed. Rep. of Germany, Jul. 11, 1985, 3524765**

**Int. Cl.⁴ H01L *31/00***

**U.S. Cl. 437—2** **8 Claims**




1. A method of producing a transparent photocathode in which one side of a wafer shaped semiconductor substrate is provided with several superposed layers, one layer of which is an active photocathode semiconductive layer, comprising applying a multi-layer wafer to a carrier surface so that the wafer projects beyond the carrier on all sides, effecting denudation of the wafer, and after a chemical denudation has been made on the substrate at least the overhanging parts of the multi-layer wafer are removed mechanically.

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## 4,713,354
## METHOD OF HEAT TREATMENT FOR REDUCTION OF DISLOCATION DENSITY NEAR III-V SUBSTRATE SURFACE

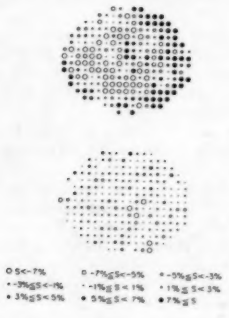
**Takashi Egawa, and Yoshiaki Sano, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan**

**Filed Feb. 28, 1986, Ser. No. 834,363**

**Claims priority, application Japan, Feb. 28, 1985, 60-40130**

**Int. Cl.⁴ H01L *21/265, 21/322***

**U.S. Cl. 437—22** **4 Claims**




1. In a method of manufacturing semiconductor devices, which comprises producing III-V compound semiconductor substrates without dislocation density near the III-V compound semiconductor substrate surface, comprising the steps of:

heat treating said III-V compound semiconductor substrate in a gas atmosphere which includes an element constitute said III-V compound semiconductor substrate; and

implanting ions for active regions after said heat-treating step.

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## 4,713,355
## BIPOLAR TRANSISTOR CONSTRUCTION

**Neal F. Gardner, Redondo Beach, Calif., assignor to TRW Inc., Redondo Beach, Calif.**

**Division of Ser. No. 600,707, Apr. 16, 1984, Pat. No. 4,631,568, which is a continuation-in-part of Ser. No. 473,382, Mar. 8, 1983, abandoned. This application Sep. 8, 1986, Ser. No. 885,614**

**Int. Cl.⁴ H01L *21/425, 21/441***

**U.S. Cl. 437—31** **22 Claims**

1. A process for bipolar transistor fabrication, comprising the steps of:

forming a base region overlying a collector region in a semiconductor material, the base and collector materials having opposite conductivity types;

forming an appropriately patterned emitter region overlying the base region, of the same conductivity type as the collector region;

forming a wall of insulating material on the base region and adjacent to the edges of the emitter region; and

forming a conductive layer over the base and emitter regions but not over the wall of insulating material, whereby the conductive layer serves to establish separate electrical contacts with the base and emitter regions, and the wall of insulating material minimizes the size of inactive portions of the base region.

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## 4,713,356
## MANUFACTURING MOS SEMICONDUCTOR DEVICE WITH PLANARIZED CONDUCTIVE LAYER

**Yoichi Hiruta, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Feb. 27, 1986, Ser. No. 833,594**

**Claims priority, application Japan, Feb. 28, 1985, 60-39235**

**Int. Cl.⁴ H01L *21/441***

**U.S. Cl. 437—41** **11 Claims**

1. A method of manufacturing a semiconductor device, comprising the sequential steps of:

(a) forming an element isolation region in a surface of a semiconductor substrate;

(b) forming a gate oxide film on an element region of said semiconductor substrate, said element region being surrounded by said element isolation region;

(c) selectively forming a gate electrode on said gate oxide film;

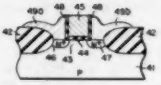
(d) forming source and drain regions in said semiconductor substrate using said gate electrode as a mask;

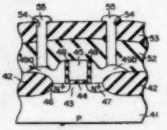
(e) selectively removing a portion of gate oxide film on said source and drain regions;

(f) forming an insulating film on side walls of said gate electrode;

(g) depositing a conductive material layer on the entire surface of the resultant structure;

(h) etching back said conductive material layer to totally remove said conductive material layer deposited on said gate electrode and on a top surface of said insulating film formed in step (f) to expose an upper surface of said gate electrode and said top surface of said insulating film to leave a portion of said conductive material layer remaining on said source and drain regions, a top surface of said





portion of said conductive material layer remaining on said source and drain regions being substantially flush with said upper surface of said gate electrode and with said top surface of said insulating film;

(i) forming an insulating protective film over the entire surface of the resultant structure;

(j) forming contact holes in said protective film; and

(k) filling a conductive material in said contact holes and forming wiring layers which are connected to said source and drain regions.

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**4,713,357**

## METHOD OF MAKING A CAPACITOR WITH REDUCED DIELECTRIC BREAKDOWN

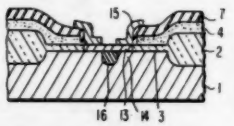
**Toru Imamura, Kumamoto, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Nov. 21, 1983, Ser. No. 553,944**

**Claims priority, application Japan, Nov. 19, 1982, 57-203400**

**Int. Cl.[4] H01L** *21/265, 21/28*

**U.S. Cl. 437—52** **8 Claims**



7. A method of manufacturing a semiconductor memory device having a plurality of memory cells, each of memory cells including a capacitive storage unit, said method comprising the steps of:

selectively forming a thick field insulating layer on a surface of a semiconductor substrate except for active regions of said substrate and a contact portion of said substrate outside said active regions,

selectively forming a thin insulating film as a dielectric film of said capacitive storage unit on said surface of said substrate in said active regions,

forming a conductive film on said thin insulating film as an upper electrode of said capacitive storage unit, and on said thick field insulating layer and connected to said contact portion of said substrate, said first conductive film being continuously formed on a whole part of said field insulating layer positioned between said contact portion and said thin insulating film in the nearest active region to said contact portion,

forming an insulating layer on said first conductive film, and

forming a second conductive film on said insulating layer, whereby electrical charges are accumulated in said first conductive film are discharged through said contact portion to said semiconductor substrate.

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**4,713,358**

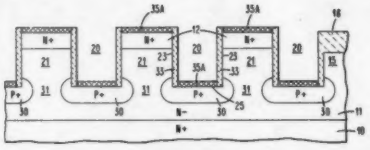
## METHOD OF FABRICATING RECESSED GATE STATIC INDUCTION TRANSISTORS

**Emel S. Bulat, Framingham; Brian M. Ditchek, Milford, and Scott J. Butler, Rochdale, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed May 2, 1986, Ser. No. 858,762**

**Int. Cl.[4] H01L** *21/283, 21/265*

**U.S. Cl. 437—65** **14 Claims**



1. The method of fabricating a semiconductor device comprising

providing a substrate of silicon of one conductivity type of relatively low resistivity having a flat, planar surface;

growing an epitaxial layer of silicon of the one conductivity type of relatively high resistivity on said surface of the substrate, said epitaxial layer having a flat, planar surface parallel to the interface of the epitaxial layer and the substrate forming a body of silicon;

introducing conductivity type imparting material of the one conductivity type into said epitaxial layer from said surface to form a layer of silicon of the one conductivity type of relatively low resistivity in said epitaxial layer adjacent to said surface;

forming a layer of protective material on the surface of the body;

removing portions of said layer of protective material to expose a plurality of parallel areas of said surface;

removing silicon at the exposed areas to form a plurality of grooves in said body of silicon providing interposed ridges of silicon having surfaces in said surface of the body, said grooves extending through said layer of silicon of the one conductivity type of relatively low resistivity into the underlying layer of the one conductivity type of relatively high resistivity, each of said grooves having side walls formed by the adjacent ridges of silicon and an end wall;

introducing conductivity type imparting material of the opposite conductivity type into the silicon at the end walls of said grooves to convert zones of silicon of the one conductivity type of relatively high resistivity to the opposite conductivity type;

removing all protective material to expose the silicon at the side walls and end walls of said grooves and at the surfaces of said ridges;

forming a layer of silicon oxide on the side walls and end walls of said grooves and on said surfaces of said ridges;

removing the layer of silicon oxide from the end walls of said grooves and from said surfaces of said ridges to expose the silicon at said end walls of the grooves and at said surfaces of said ridges while leaving silicon oxide overlying the side walls of said grooves;

depositing a silicide-forming metal overlying the silicon oxide at the side walls of the grooves, the silicon at the end walls of the grooves, and the silicon at the surfaces of the ridges;

heating to cause the silicide-forming metal to react with the

underlying silicon to form metal silicide in ohmic contact with the silicon at the end walls of the grooves and at the surfaces of the ridges, the silicide-forming metal not reacting with the underlying silicon oxide layer on the side walls; and

removing the unreacted silicide-forming metal overlying the silicon oxide layer on the side walls while leaving the metal silicide in ohmic contact with the silicon at the end walls of the grooves and at the surfaces of the ridges.

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**4,713,359**

## INFRARED ABSORBING GLASS COMPOSITIONS

**Daniel P. Lubelski, Rossford, and Rodney G. Baker, Toledo, both of Ohio, assignors to Libbey-Owens-Ford Co., Toledo, Ohio**

**Filed Apr. 14, 1986, Ser. No. 851,588**
**Int. Cl.[4] C03C *3/078***
**U.S. Cl. 501—63** **7 Claims**

1. A glass composition comprising the following ingredients in approximate percent by weight:

| Ingredients | Percent by Weight |
|---|---|
| $SiO_2$ | 60–80 |
| $Na_2O$ | 10–20 |
| $K_2O$ | 0–10 |
| CaO | 5–16 |
| MgO | 0–10 |
| $Al_2O_3$ | 0–5 |
| $TiO_2$ | 0–0.5 |
| $SO_3^-$ | 0–0.5 |
| $Fe_2O_3$ | 0.3–0.86 |
| $SnO_2$ | 0.5–2.0 |
| $P_2O_5$ | 0.01–1 |

the composition absorbing infrared rays.

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**4,713,360**

## NOVEL CERAMIC MATERIALS AND METHODS FOR MAKING SAME

**Marc S. Newkirk, Newark, Del., and Steven F. Dizio, Golts, Md., assignors to Lanxide Technology Company, LP, Newark, Del.**

**Continuation-in-part of Ser. No. 776,964, Sep. 17, 1985, which is a continuation-in-part of Ser. No. 705,787, Feb. 26, 1985, which is a continuation-in-part of Ser. No. 591,392, Mar. 16, 1984. This application Jan. 15, 1986, Ser. No. 818,943**
**Int. Cl.[4] C04B *35/10, 35/56, 35/58***
**U.S. Cl. 501—87** **29 Claims**

1. A method for producing a self-supporting ceramic body, adapted or fabricated for use as an article of commerce, by oxidation of a parent metal to form a polycrystalline material consisting essentially of (1) the oxidation reaction product of said parent metal with a vapor-phase oxidant, and (2) one or more non-oxidized constituents of the parent metal, which comprises: heating said parent metal to a temperature above the melting point of said parent metal but below the melting point of the oxidation reaction product to form a body of molten metal and, at said temperature;

(a) reacting said body of molten metal with said vapor-phase oxidant to form said oxidation reaction product,

(b) maintaining at least a portion of said oxidation reaction product in contact with and between said body of molten metal and said oxidant, to draw molten metal through the oxidation reaction produot towards the oxidant so that oxidation reaction product continues to form at the interface between the oxidant and previously formed oxidation reaction product, and leaving non-oxidized constituents of said parent metal dispersed through said polycrystalline material, and

(c) continuing said reaction for a time sufficient to produce said ceramic body.

**4,713,361**

## METALLIC CATALYST BODY HAVING THERMAL RADIATION PROTECTION

**Wolfgang Maus, Bergisch Gladbach, Fed. Rep. of Germany, assignor to Interatom GmbH, Bergisch Gladbach, Fed. Rep. of Germany**

**Filed Jan. 15, 1987, Ser. No. 3,558**
**Claims priority, application Fed. Rep. of Germany, Jan. 15, 1986, 3601011**
**Int. Cl.[4] B01J *35/04***
**U.S. Cl. 502—2** **10 Claims**

1. Metallic catalyst body, comprising a casing, and a metallic honeycomb structure having layers disposed within said casing, said metallic honeycomb structure having at least one other layer disposed outside said casing as thermal radiation protection.

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**4,713,362**

## SELECTIVE ZEOLITIC ADSORBENT AND A METHOD FOR ACTIVATION THEREOF

**Peter J. Maroulis, Allentown; Charles G. Coe, Macungie; Steven M. Kuznicki, Easton; Patrick J. Clark, Palmerton, and David A. Roberts, Allentown, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.**

**Filed May 22, 1986, Ser. No. 866,531**
**Int. Cl.[4] B01J *29/06, 39/06***
**U.S. Cl. 502—85** **26 Claims**

26. A selective chromatographic adsorbent produced by activation of a zeolitic composition, wherein said zeolitic composition has at least a portion of any exchangeable ion capacity exchanged with a metal cation having a charge density of about 2.0 or greater, said activation comprising heating said exchanged zeolitic composition in a nonreactive oxidizing atmosphere from ambient temperature to about 400° C. and heat soaking at that temperature said exchanged zeolitic composition for a period of time sufficient to thoroughly dehydrate and react in an oxidizing atmosphere the zeolitic composition.

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**4,713,363**

## HIGH SURFACE AREA SUPPORTED NOBLE METAL CATALYSTS AND PROCESS FOR THEIR PREPARATION

**Dennis A. Hucul, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 686,878, Dec. 27, 1984, abandoned. This application Oct. 10, 1986, Ser. No. 918,597**
**Int. Cl.[4] B01J *21/04, 21/08, 23/40***
**U.S. Cl. 502—262** **21 Claims**

1. A composition of matter comprising a substrate of a metal oxide of volume from about $3\times10^{-9}$ $m^3$ to about $2\times10^{-5}$ $m^3$ having a surface area from about 50 $m^2/g$ to about 600 $m^2/g$, having dispersed on the surface thereof crystallites of a noble metal selected from the group consisting of ruthenium, rhodium, palladium, osmium, iridium, platinum and mixtures thereof, wherein the noble metal comprises from about 0.45 mmole/g to about 1.0 mmole/g based on total composition weight and the crystallites are sized so as to provide a dispersion of the noble metal of from about 50 percent to about 90 percent when measured by hydrogen chemisorption using the formula

$$D=100\times(W/M)$$

where

(W/M)

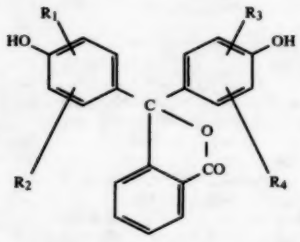
is the atomic ratio of chemisorbed hydrogen to the noble metal.

## 4,713,364
## HEAT-SENSITIVE RECORDING MATERIAL

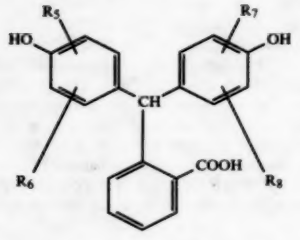
Naoto Arai, Osaka, Japan, assignor to Kanzaki Paper Mfg. Co., Ltd., Tokyo, Japan

Filed Mar. 6, 1986, Ser. No. 836,554
Int. Cl.[4] B41M 5/18
U.S. Cl. 503—209 5 Claims

1. A heat-sensitive recording material comprising a support having formed thereon a heat-sensitive recording layer comprising a colorless or pale-colored basic dye and a color developer capable of forming a color upon coming into contact with the basic dye, wherein said heat-sensitive recording layer further comprises at least one compound selected from the compounds represented by following formulae (I) and (II):




(I)




(II)

wherein $R_1$, $R_2$, $R_3$, $R_4$, $R_5$, $R_6$, $R_7$, and $R_8$ independently represent a hydrogen atom or an alkyl group having from 1 to 4 carbon atoms.

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## 4,713,365
## ADHESIVES FOR LAMINATING THERMAL PRINT ELEMENTS

Daniel J. Harrison, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 29, 1986, Ser. No. 947,053
Int. Cl.[4] B41M 5/26
U.S. Cl. 503—227 17 Claims

1. A thermal print element comprising a support having thereon a layer containing a thermally-transferred dye image, said element having at least one layer of adhesive thereon comprising a linear, random copolyester of one or more aromatic dibasic acids and one or more aliphatic diols, modified with up to 30 mole % of one or more aliphatic dibasic acids, said copolyester having a melt viscosity of between about 1,000 and about 20,000 poise at 150° C.

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## 4,713,366
## ANTIGENIC MODIFICATION OF POLYPEPTIDES

Vernon C. Stevens, Dublin, Ohio, assignor to The Ohio State University Research Foundation, Columbus, Ohio

Filed Dec. 4, 1985, Ser. No. 804,642
Int. Cl.[4] A61K 37/43; C07K 7/08, 7/10
U.S. Cl. 514—13 15 Claims

1. A modified polypeptide for isoimmunologically controlling biological action in a mammal by antibody formation, the modified polypeptide comprising a peptide having an amino acid sequence substantially similar to the region of a mammalian lutenizing hormone, chorionic gonadotropin, follicle secreting hormone or thyroid stimulating hormone corresponding to the 38–57 region of the beta-subunit of human chorionic gonadotropin, said peptide having the two cysteine residues corresponding to the cysteine residues at positions 38 and 57 of the beta-subunit of human chorionic gonadotropin having their sulfur atoms linked in a disulfide bridge, said peptide having been chemically modified outside the body of said mammal, said peptide having the properties of:

(a) in unmodified form, being non-immunogenic to said mammal and having a molecular structure similar to a fragment of an endogenous protein hormone, the biological function of which it is desired to inhibit, and

(b) in modified form, causing antibodies to be formed in the body of the mammal which inhibit the biological function of said endogenous protein hormone following administration of the modified form into the body of said mammal.

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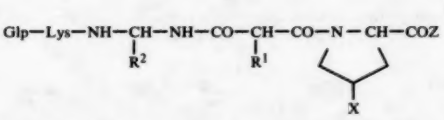
## 4,713,367
## RETRO-INVERSO ANALOGS OF THE BRADYKININ POTENTIATING PEPTIDE $BPP_{5a}$

Alessandro Sisto, Rome; Antonio S. Verdini, Monterotondo, and Antonino Virdia, Rome, all of Italy, assignors to Enichem S.p.A., Milan, Italy

Filed Jan. 22, 1986, Ser. No. 821,449
Int. Cl.[4] A61K 37/42; C07K 7/18, 7/02
U.S. Cl. 514—17 7 Claims

1. A peptide of the general formula




(I)

wherein $R^2$ and $R^1$ are the same or different and represent, each independently, the side chain of an aminoacid residue present in the naturally occuring peptides, X represents -S-Ph or -O-$CH_2$-Ph, and Z is a hydroxy, alkoxy or amino group; and pharmaceutically acceptable salts thereof.

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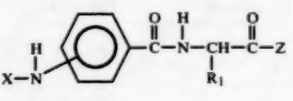
## 4,713,368
## PEPTIDO-MIMETIC SUBSTANCES WITH HYPOTENSIVE ACTION

Alessandro Sisto; Antonio S. Verdini; Antonino Virdia; Giovanna De Luca; Giovanni Di Stazio, and Vincenzo Politi, all of Rome, Italy, assignors to Eniricerche S.p.A., Milan and Polifarma S.p.A., Rome, both of, Italy

Filed Jul. 17, 1986, Ser. No. 887,136
Claims priority, application Italy, Aug. 1, 1985, 21826 A/85
Int. Cl.[4] A61K 37/64; C07K 7/02
U.S. Cl. 514—18 12 Claims

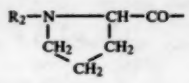
1. Peptido-mimetic compounds of hypotensive action definable by the general formula:




(I)

in which

X represents the pyroglutamic acid residue or a



residue where $R_2$ represents a hydrogen atom, an alkyloxycarbonyl, an arylalkyloxycarbonyl or an acyl group with a maximum of between 1 and 7 carbon atoms in the linear chain

$R_1$ represents the aromatic residue of L-phenylalanine, L-tyrosine or L-tryptophan, and

Z represents a hydroxyl, hydroxyalkyl, amino or alkylamino group.

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**4,713,369**

## OLIGOPEPTIDYLARGININOL DERIVATIVES AND THEIR HOMOLOGS, A PROCESS FOR THEIR PREPARATION, THEIR USE AND AGENTS CONTAINING THEM

**Werner Stüber, Lahntal, Fed. Rep. of Germany, assignor to Behringwerke Aktiengellschaft, Fed. Rep. of Germany**

**Filed Feb. 14, 1986, Ser. No. 829,482**

**Claims priority, application Fed. Rep. of Germany, Feb. 18, 1985, 3505555**

**Int. Cl.[4] A61K** *37/43;* **C07K** *5/08;* **C07C** *103/20*

**U.S. Cl. 514—18** **8 Claims**

1. An oligopeptidylargininol derivative and its homologs of the formula

X-D-Phe-Pro-A-Y.(HB)$_n$

being a hydrogen atom or a known protective group customary in peptide chemistry,

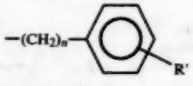
D-Phe being D-phenylalanine,

Pro being L-proline,

A being an argininol residue or homologs of argininol of the general formula —NHCH[$(CH_2)_m$NHC(NH)$NH_2$]$CH_2$—O— m being 2 to 5;

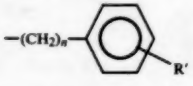
Y being a hydrogen atom, a radical of the following structure:

Y=—OC—R, with R=H, an aliphatic radical having up to 4 carbon atoms, or



R' being H, $CH_3$, $OCH_3$ or $NO_2$, and n being 0, 1 or 2, or a radical of the following structure:

Y=—$SO_2$—R with R=OH, an aromatic or araliphatic radical of the structure



R' being H, $CH_3$ or $OCH_3$, and n being 0, 1 or 2,

B being an acid residue, and

n being 0, 1 or 2.

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**4,713,370**

## CARNITINE AND ITS USE IN REDUCING CARDIAC TOXICITY AND AS A SYNERGIST WITH CYTOSTATS

**Stephen L. De Felice, 235 Munsee Way, Westfield, N.J. 07090**

**Continuation of Ser. No. 966,057, Dec. 4, 1978, abandoned, which is a division of Ser. No. 799,743, May 23, 1977, Pat. No. 4,,267,163, which is a continuation-in-part of Ser. No. 681,063, Apr. 28, 1976, Pat. No. 4,075,352, which is a continuation-in-part of Ser. No. 485,301, Jul. 2, 1974, Pat. No. 3,968,241, which is a continuation-in-part of Ser. No. 303,772, Nov. 6, 1972, Pat. No. 3,830,931. This application Apr. 22, 1982, Ser. No. 371,005**

**Int. Cl.[4] A61K** *31/70, 31/195*

**U.S. Cl. 514—34** **8 Claims**

1. A method of effecting cytoxicity in humans and animals which comprises administering to a human or animal in need thereof, a therapeutically effective amount of a cytostat selected from the group consisting of daunomycin, N-acetyldaunomycin and daunomycin oxine and a synergistically effective amount of βhydroxy-γ-trimethylaminobutyric acid, an isomer thereof, a pharmaceutically acceptible salt thereof or a pharmaceutically acceptable salt of an isomer thereof.

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**4,713,371**

## ANTHRACYCLINE DERIVATIVES AND THEIR USE AS CYTOSTATICS

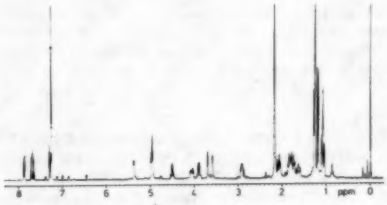
**Werner Aretz, Kelkheim; Hans G. Berscheid, Schwalbach; Gerhard Huber, Kelkheim; Hans-Wolfram Fehlhaber, Idstein; Hans P. Kraemer; Hans-Harald Sedlacek, both of Marburg, all of Fed. Rep. of Germany; Bimal N. Ganguli, Bombay, India; Ratan S. Sood, Bombay, India; Julia Gandhi, Bombay, India, and Gauknapalli C. Reddy, Bombay, India, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

**Continuation of Ser. No. 624,374, Jun. 25, 1984, abandoned. This application Feb. 3, 1986, Ser. No. 824,939**

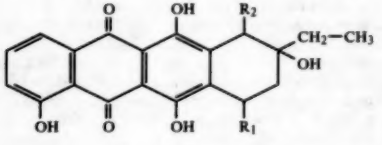
**Claims priority, application Fed. Rep. of Germany, Jun. 25, 1983, 3823025**

**Int. Cl.[4] A61K** *31/71;* **C07H** *15/24*

**U.S. Cl. 514—34** **12 Claims**




1. A compound of the formula I



I

wherein $R_1$ represents the radical $OR_3$, and $R_2$ represents the radical $OR_4$, $R_3$ and $R_4$ being identical or different and representing sugar combinations of the following composition: Roa—dF—Rod, Roa—dF—Cin A, Roa—dF=Cin B, Roa—Rod—Rod, Roa—Rod—Cin A, Roa—Rod—Acu, Rod—Rod—Rod, Roa—dF—Acu, Roa—Rod or Roa—dF, except that when $R_4$ is Roa—Rod—Rod or Roa—dF, $R_3$ cannot be Roa—Rod or Roa—dF—Rod, in which

Roa: represents rhodosamine,

dF: represents deoxyfucose,

Rod: represents rhodinose,
Acu: represents aculose,
Cin A: represents cinerulose A and
Cin B: represents cinerulose B,
and dF═Cin B denotes that the two sugar units are linked, or a physiologically acceptable acid addition salt thereof.

12. A pharmaceutical composition for use as a cytostatic agent comprising a therapeutically effective amount of the compound according to claim 1 or its physiologically acceptable salts in association with a pharmaceutically acceptable carrier.

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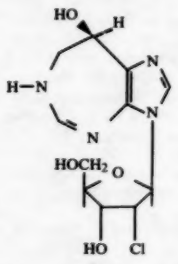
4,713,372

## 2-CHLOROPENTOSTATIN COMPOUND HAVING ADENOSINE DIAMINASE INHIBITORY ACTIVITY

John P. Schaumberg, Ypsilanti; Gerard C. Hokanson; James C. French, both of Ann Arbor; Josefino B. Tunac, Troy, and Marjorie A. Underhill, Pigeon, all of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation of Ser. No. 590,239, Mar. 16, 1984, abandoned.
This application Nov. 8, 1985, Ser. No. 796,139
Int. Cl.[4] A61K *31/70*; C07H *17/02*
U.S. Cl. 514—45 3 Claims

1. The compound 2'chloropentostatin having adenosine deaminase inhibitory activity and possessing the structure



or a pharmaceutically acceptable acid addition salt thereof.

3. A method of treating infections of DNA viruses in a mammal comprising administering to a mammal in need of such treatment an effective amount of a pharmaceutical composition in accordance with claim 2.

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4,713,373

## XYLAN SULFATES OF LOW MOLECULAR WEIGHT, PROCESS FOR THEIR PREPARATION AND MEDICAMENTS CONTAINING THEM

Alain Bayol, Tournefeuille; Francis Blanc, Lattes; Jacqueline Lansen, Montpellier; Jean-Pierre Maffrand, and Jean-Marie Pereillo, both of Portet, all of France, assignors to Sanofi S.A., Paris, France

Filed Oct. 31, 1985, Ser. No. 793,657
Claims priority, application France, Nov. 7, 1984, 84 17460
Int. Cl.[4] A61K *31/725*; C08B *37/14, 37/00*
U.S. Cl. 514—54 18 Claims

1. Xylan sulfates having an average degree of sulfation of from 1.5 to 2, from 0 to 10 percent uronic acid, from 30 to 40 percent pentroses and an average molecular weight of from 2000 to 5000 daltons.

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4,713,374

## GANGLIOSIDE DERIVATIVES

Francesco della Valle, Padua, and Aurelio Romeo, Rome, both of Italy, assignors to Fidia, S.p.A., Abano Terme, Italy

Filed Jun. 26, 1985, Ser. No. 749,092
Claims priority, application Italy, Jun. 27, 1984, 48492 A/84
Int. Cl.[4] C08G *18/08, 18/18*
U.S. Cl. 514—54 39 Claims

1. A ganglioside derivative comprised of an oligosaccharide moiety formed by 1 to 5 monosaccharides, at least one sialic acid moiety and at least one ceramide moiety, the carboxyl groups of said sialic acid moieties being esterified with an alcohol, said alcohol being a substituted or unsubstituted alcohol selected from the group consisting of a $C_{1-12}$ aliphatic alcohol, a $C_{1-12}$ araliphatic alcohol with only one benzene ring, a $C_{1-12}$ heterocyclic alcohol with one heterocyclic ring containing a heteroatom selected from the group consisting of N, S and O, a $C_{1-14}$ alicyclic alcohol, and a $C_{1-14}$ aliphaticalicyclic alcohol containing only one cycloaliphatic ring, with the proviso that said ganglioside derivative is not the methyl ester of ganglioside $G_{M1}$ or $G_{M3}$.

26. A method for the treatment of pathologies of the nervous system of one affected therewith, comprising administering thereto an effective nerve pathology treatment amount of a ganglioside derivative according to claim 1.

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4,713,375

## VISCOELASTIC SOLUTION

Richard L. Lindstrom, 1065 W. Ferndale Rd., Wayzata, Minn. 55391, and Debra L. Skelnik, Box 344, Rte. 5, Cambridge, Minn. 55008

Filed Aug. 1, 1985, Ser. No. 761,406
Int. Cl.[4] A61K *31/70*
U.S. Cl. 514—57 1 Claim

1. A method of protecting cells and cell coatings during eye surgery, which method comprises bringing the cells or cell coatings into contact with a viscoelastic composition for use in ophthalmic surgery, which composition comprises effective amounts of:

a. a buffered solution which is at least one of a balanced salt solution, a buffered minimum essential medium, a phosphate buffered system, or TC 199;
b. at least one of a cellulose gum, carboxypropyl methyl cellulose or hydroxypropyl methyl cellulose; and,
c. chondroitin sulfate, the composition having a pH of 7.2–7.6 and an osmolality of 200–400 MOSM.

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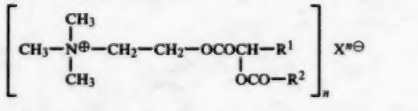
4,713,376

## DEMENTIA-IMPROVING AND THERAPEUTIC AGENTS

Fumio Kuzuya, Nagoya, and Hidetoshi Endo, Ichinomiya, both of Japan, assignors to Toyama Chemical Co., Ltd., Tokyo, Japan

Filed Nov. 14, 1986, Ser. No. 930,452
Claims priority, application Japan, Nov. 19, 1985, 60-257881
Int. Cl.[4] A61K *31/685*
U.S. Cl. 514—78 5 Claims

1. A method of treating neuropsychiatric symptoms accompanying dementia in said patient which comprises administering to a patient a therapeutically effective amount of a therapeutic agent comprising, as an active ingredient, an acyloxyalkanoylcholine salt represented by the following formula:



wherein $R^1$ and $R^2$, which may be the same or different, represent lower alkyl groups of 1 to 5 carbon atoms; X represents a sulfonic acid residue; and n is the same as the number of the sulfonyloxy groups of the sulfonic acid residue and represents an integer of 1 to 4.

4,713,377

## METHOD OF AMELIORATING OBSTRUCTIONS OF THE BOWEL

Thomas L. Schulte, 218 Family Farm Dr., Woodside, Calif. 94062

Continuation-in-part of Ser. No. 697,101, Feb. 1, 1985, Pat. No. 4,626,530, which is a continuation-in-part of Ser. No. 517,417, Jan. 17, 1984, Pat. No. 4,497,824, and a continuation-in-part of Ser. No. 456,896, Jan. 10, 1983, Pat. No. 4,469,702, said Ser. No. 517,417, and Ser. No. 456,896, each is a continuation-in-part of Ser. No. 276,566, Jun. 23, 1981, Pat. No. 4,369,190. This application Dec. 1, 1986, Ser. No. 936,282

Int. Cl.[4] A61K *31/615*

U.S. Cl. 514—166 18 Claims

1. A method of ameliorating an obstruction of the bowel, which comprises the rectal administration to the affected patient of an amount of biphenamine effective to enlarge the fecal passage of the bowel proximate the source of the obstruction.

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4,713,378

## PENEM DERIVATIVES

Ettore Perrone; Marco Alpegiani; Franco Zarini; Costantino D. Bruna, and Giovanni Franceschi, all of Milan, Italy, assignors to Farmitalia Carlo Erba S.p.A., Milan, Italy

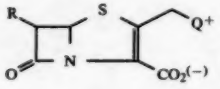
Filed Jun. 24, 1985, Ser. No. 747,829

Claims priority, application United Kingdom, Jun. 29, 1984, 8416651

Int. Cl.[4] C07D *499/00;* A61K *31/425*

U.S. Cl. 514—192 14 Claims

1. A compound of the formula

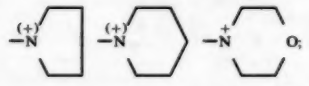


wherein R is a $C_1$–$C_3$ alkyl group substituted by a hydroxy group and $Q^+$ represents a group

wherein

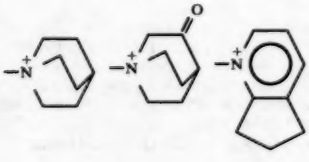
(i) $R_1$, $R_2$ and $R_3$ are each independently a $C_1$–$C_4$ alkyl radical or

(ii) $R_1$ is $C_1$–$C_4$ alkyl unsubstituted or substituted by a cyano group and $R_2$, $R_3$ taken together with the nitrogen atom represent one of the heterocyclylammonium radicals



or

(iii) $R_1$, $R_2$, $R_3$ taken together with the nitrogen atom represent one of the radicals



4,713,379

## FUNGICIDAL AGENTS

Wolfgang Krämer, Wuppertal; Joachim Weissmüller, Monheim; Wolf Reiser; Dieter Berg, both of Wuppertal; Wilhelm Brandes, Leichlingen, and Paul Reinecke, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

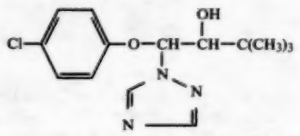
Filed May 17, 1985, Ser. No. 735,498

Claims priority, application Fed. Rep. of Germany, Jun. 5, 1984, 3420828

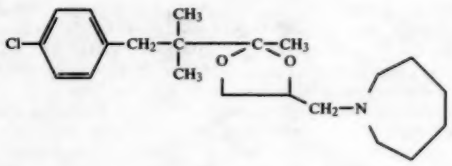
Int. Cl.[4] A01N *43/46, 43/64*

U.S. Cl. 514—212 4 Claims

1. A fungicidal composition comprising 1 to 50 parts by the weight of the compound of the formula



and 1 part by weight of the compound of the formula



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4,713,380

## PRODUCTION OF OPTICALLY PURE ORGANOBORANES

Herbert C. Brown, West Lafayette, Ind., assignor to Aldrich-Boranes, Inc., Milwaukee, Wis.

Filed Jan. 16, 1985, Ser. No. 692,046

Int. Cl.[4] C07F *5/02*

U.S. Cl. 568—1 32 Claims

1. A process for upgrading to essentially 100% enantiomeric excess the optical purity of an organoborane intermediate represented by the formulae:

$IpcBHR^*$

or

$Ipc_2BR^*$

wherein Ipc is isopinocampheyl, and R* is alkyl having from 4 to 30 carbon atoms comprising the steps of:

(a) reacting an alkene selected from the group consisting of a cis-alkene, trans-alkene or tertiary-alkene with a hydroborating agent selected from the group consisting of monoisopinocampheylborane and diisopinocampheylborane;

(b) obtaining a solid intermediate; and

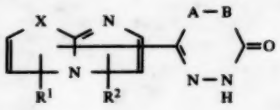
(c) recrystallizing the resulting solid hydroboration product from a suitable solvent to obtain a monoisopinocampheylalkylborane or diisopinocampheylalkylborane of essentially 100% enantiomeric excess.

## 4,713,381
## OXODIAZINE COMPOUNDS AND PHARMACEUTICAL COMPOSITIONS THEREOF

Hideki Ao; Minoru Obata; Tsutomu Yamanaka, all of Oita, and Hiroshi Mikashima, Fukuoka, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

Filed May 27, 1986, Ser. No. 867,170
Claims priority, application Japan, May 25, 1985, 60-112715
Int. Cl.[4] A61K *31/535, 31/54;* C07D *487/04*
U.S. Cl. 514—222 7 Claims

1. An oxodiazine compound of the formula:



or a pharmaceutically acceptable acid addition salt thereof, wherein each of $R^1$ and $R^2$ is hydrogen, halogen, $C_{1-4}$ alkyl, $C_{1-4}$ alkoxy, $C_{1-4}$ alkoxy-$C_{1-4}$ alkoxy, phenyl-$C_{1-4}$ alkyl-oxy which may be optionally substituted by at least one substituent selected from the group consisting of halogen, $C_{1-4}$ alkyl and $C_{1-4}$ alkoxy on the phenyl nucleus, or phenyl which may be substituted by at least one substituent selected from the group consisting of halogen, $C_{1-4}$ alkyl and $C_{1-4}$ alkoxy on the phenyl nucleus; X is —S—, —CH=N— or —C($R^3$)=C($R^4$)—, where each of $R^3$ and $R^4$ is hydrogen, halogen, $C_{1-4}$ alkyl, $C_{1-4}$ alkoxy, $C_{1-4}$ alkoxy-$C_{1-4}$ alkoxy or phenyl-$C_{1-4}$ alkyl-oxy which may be optionally substituted by at least one substituent selected from the group consisting of halogen, $C_{1-4}$ alkyl and $C_{1-4}$ alkoxy on the phenyl nucleus; and one of A and B is oxygen or sulfur and the other is —C($R^5$)($R^6$)—, where each of $R^5$ and $R^6$ is hydrogen or $C_{1-4}$ alkyl.

7. A pharmaceutical composition comprising a compound of claim 1 in a therapeutically effective amount sufficient to inhibit platelet aggregation, increase blood flow, or act as an analgesic or anti-inflammatory agent with pharmaceutically acceptable additives.

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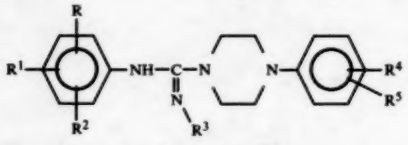
## 4,713,382
## N-PHENYL-4-PHENYL-1-PIPERAZINECARBOXAMIDINES AND RELATED COMPOUNDS AS ANTIARRHYTHMIC AGENTS

Jean-Claude Pascal, Cachan, France, assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed May 30, 1985, Ser. No. 739,393
Int. Cl.[4] A61K *31/495;* C07D *295/06, 295/12*
U.S. Cl. 514—255 20 Claims

1. A compound of the formula:



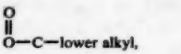
in which:

R, $R^1$ and $R^2$ are each independently hydrogen, halo, lower alkyl, lower alkoxy, —$CF_3$ or —$NO_2$, with the proviso that R is hydrogen when both $R^1$ and $R^2$ are iodo or —$NO_2$;

$R^3$ is hydrogen, lower alkyl, lower alkyl—OH,

or lower alkenyl; and

$R^4$ and $R^5$ are each independently hydrogen, halo, lower alkoxy, —OH, —$CH_3$ or



and the pharmaceutically acceptable acid addition salts and esters thereof.

20. A method of treating arrhythmia in mammals which comprises administering to a mammal in need of such treatment a therapeutic amount of a compound of claim 1 or a pharmaceutically acceptable acid addition salt or ester thereof.

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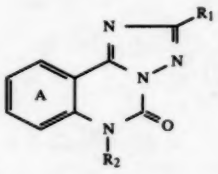
## 4,713,383
## TRIAZOLOQUINAZOLINE COMPOUNDS, AND THEIR METHODS OF PREPARATION, PHARMACEUTICAL COMPOSITIONS, AND USES

John E. Francis, Basking Ridge, and Karl O. Gelotte, Watchung, both of N.J., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 782,235, Sep. 20, 1985, abandoned, which is a continuation-in-part of Ser. No. 655,831, Oct. 1, 1984, abandoned. This application Mar. 26, 1986, Ser. No. 844,447
Int. Cl.[4] A61K *31/505;* C07D *487/04*
U.S. Cl. 514—267 23 Claims

1. A [1,2,4]triazolo[1,5-c]quinazoline-5-one compound of the formula



(A)

wherein

$R_1$ is

(a) phenyl which is unsubstituted or substituted by lower alkyl, lower alkoxy, hydroxy, halogen, or trifluoromethyl; or

(b) furyl, dihydrofuranyl, tetrahydrofuranyl, thienyl, dihydrothienyl, tetrahydrothienyl, pyranyl, pyridyl, or o-ribofuranosyl, each of which is bound to the triazoloquinazoline nucleus via a ring carbon atom, and each of which is unsubstituted or substituted by lower alkyl, hydroxy, amino, halogen, or hydroxy-lower alkyl;

$R_2$ is hydrogen or lower alkyl;

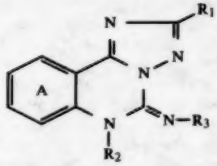
ring A is unsubstituted or substituted by a substituent selected from lower alkyl, lower alkoxy, hydroxy, halogen, trifluoromethyl, nitro, amino, $C_{1-3}$ alkylthio, $C_{1-2}$ alkylsulfonyl, $C_{1-2}$ alkylsulfinyl, and aryl-lower alkoxy, wherein said aryl portion is selected from phenyl, pyridyl, thienyl, and furyl, and said aryl portion is unsubstituted or further substituted by lower alkyl, halogen, hydroxy, nitro, amino, mono-lower alkylamino, or di-lower alkyl amino;

a tautomer thereof; and

a pharmaceutically acceptable salt of said compound of formula A or said tautomer.

7. A method of counteracting the effects of benzocarbamazepine comprising administering to a mammal in need of such administration of benzocarbamazepine countering effective amount of a compound according to claim 1 provided said compound does not have a benzyloxy group as a substituent on said ring A.

10. A 5-imino[1,2,4]triazolo[1,5-c]quinazoline compound of the formula



(E)

wherein

$R_1$ is

(a) phenyl which is unsubstituted or substituted by lower alkyl, lower alkoxy, hydroxy, halogen, or trifluoromethyl; or

(b) furyl, thienyl, dihydrofuranyl, tetrahydrofuranyl, dihydrothienyl, tetrahydrothienyl, pyranyl, pyridyl, or o-ribofuranosyl, each of which is bound to the triazoloquinazoline nucleus via a ring carbon atom, and each of which is unsubstituted or substituted by lower alkyl, hydroxy, amino, halogen, or hydroxy-lower alkyl;

$R_2$ is hydrogen or lower alkyl;

$R_3$ is hydrogen, lower alkyl, $C_{3-20}$ cycloalkyl, lower alkenyl, lower alkynyl, amino-lower alkyl, mono-lower alkylamino-lower alkyl, di-lower alkyl-amino-lower alkyl, hydroxy-lower alkyl, aryl, or aryl-lower alkyl, provided the double and triple bonds present in said $R_3$ lower alkenyl and $R_3$ lower alkynyl groups are separated from the nitrogen to which $R_3$ is attached by at least one saturated carbon atom, said aryl group in $R_3$ is phenyl, pyridyl, thienyl, or furyl, which aryl group is unsubstituted or further substituted by lower alkyl, halogen, hydroxy, nitro, amino, mono-lower alkyl-amino, or di-lower alkyl-amino; and

ring A is unsubstituted or substituted by lower alkyl, lower alkoxy, hydroxy, halogen, trifluoromethyl, nitro, amino, $C_{1-3}$ alkylthio, $C_{1-2}$ alkylsulfonyl, $C_{1-2}$ alkylsulfinyl, or aryl-lower alkoxy, wherein said aryl group within said aryl-lower alkoxy is phenyl, pyridyl, thienyl, or furyl, which is unsubstituted or further substituted by lower alkyl, halogen, hydroxy, nitro, amino, mono-lower alkyl-amino, or di-lower alkyl-amino;

a tautomer thereof; and

a pharmaceutically acceptable salt of said compound or said tautomer.

**15**. A method counteracting the effects of adenosine and of treating asthma comprising administering to a mammal in need of such administration an effective amount of a compound of claim **10**, a tautomer thereof, or a pharmaceutically acceptable salt of said compound or said tautomer.

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**4,713,384**

## SELECTIVE METHOD FOR BLOCKING $5HT_2$ RECEPTORS

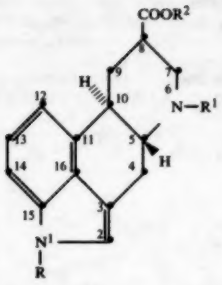
**Marlene L. Cohen; Ray W. Fuller; William L. Garbrecht, all of Indianapolis, and Kathleen R. Whitten, Zionsville, all of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Oct. 1, 1985, Ser. No. 782,338**

**Int. Cl.[4] A61K** *31/48;* **C07D** *457/04*

**U.S. Cl. 514—288** **2 Claims**

**1**. A method of blocking $5HT_2$ receptors without effect on alpha receptors which comprises administering to a mammal having an excess of serotonin centrally or peripherally an $5HT_2$ blocking dose which does not affect alpha receptors of an ergoline of the formula:



wherein R is primary or secondary $C_{1-8}$ alkyl, $CH_2C_{2-4}$ alkeny, $C_{3-8}$ cycloalkyl or $C_{3-6}$ cycloalkyl-substituted $C_{1-5}$ primary or secondary alkyl, the total number of carbon atoms in R not to exceed 8; $R^1$ is $C_{1-4}$ straight chain alkyl or allyl, and $R^2$ is hydroxy $C_{5-7}$ cycloalkyl, and pharmaceutically acceptable acid addition salts thereof.

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**4,713,385**

## ALKOXY AND DIALKOXYALKYL ESTERS OF DIHYDROLYSERGIC ACID AND RELATED COMPOUNDS USEFUL AS 5HT RECEPTOR ANTAGONISTS

**Gifford P. Marzoni, and William L. Garbrecht, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

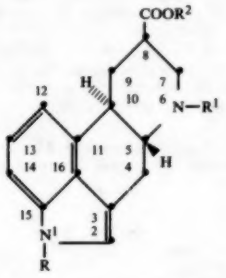
**Filed Oct. 1, 1985, Ser. No. 782,341**

**The portion of the term of this patent subsequent to Jan. 7, 2003, has been disclaimed.**

**Int. Cl.[4] A61K** *31/48;* **C07D** *457/04*

**U.S. Cl. 514—288** **18 Claims**

**1**. A compound of the formula:



wherein R is primary or secondary $C_{1-8}$ alkyl, $C_{2-4}$ alkenyl-$CH_2$, $C_{3-8}$ cycloalkyl or $C_{3-6}$ cycloalkyl substituted $C_{1-5}$ primary or secondary alkyl, the total number of carbon atoms in R not to exceed 8; $R^1$ is allyl, H or $C_{1-4}$ straight-chain alkyl; and $R^2$ is a primary or secondary $C_{1-3}$ alkoxy $C_{2-6}$-alkyl or di($C_{1-3}$ alkoxy)$C_{2-6}$ alkyl; and pharmaceutically-acceptable salts thereof.

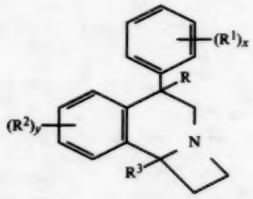
**4,713,386**

## TETRAHYDROAZETO [2,1-A]ISOQUINOLINES AND METHODS FOR TREATING DEPRESSION

**Bruce E. Maryanoff, New Hope, Pa., assignor to McNeilab, Inc., Fort Washington, Pa.**

**Filed Sep. 22, 1986, Ser. No. 909,793**
**Int. Cl.[4] A61K** *31/435;* **C07D** *471/04*
**U.S. Cl. 514—294** **16 Claims**

**1**. A 1,4,5,9b-tetrahydroazeto[2,1-a]isoquinoline of the following formula (I):



(I)

wherein
R is hydrogen or alkyl;
$R^1$ is independently halogen, alkyl, alkoxy, alkylthio, perfluoroalkyl or nitro;
$R^2$ is independently halogen, alkyl or alkoxy;
$R^3$ is hydrogen or alkyl;
x is the integer 0, 1 or 2; and
y is the integer 0, 1 or 2;
wherein said alkyl for R, $R^1$, $R^2$ and $R^3$ is alkyl of about 1 to 4 carbons, said alkoxy for $R^1$ and $R^2$ is alkoxy of about 1 to 4 carbons, said alkylthio for $R^1$ is alkylthio of about 1 to 4 carbons and said perfluoroalkyl for $R^1$ is perfluoroalkyl of about 1 to 4 carbons,
and the pharmaceutically-acceptable acid-addition salts thereof.

**13**. A pharmaceutical composition for the treatment of depression which comprises a pharmaceutically-acceptable carrier or diluent and an amount sufficient to alleviate the symptoms of depression of 1,4,5,9b-tetrahydroazeto[2,1-a]isoquinoline of claim **1**.

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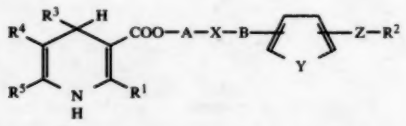
**4,713,387**

## VASODILATING AND PLATELET AGGREGATION INHIBITING 1,4 DIHYDROPYRIDINES WITH AN IMIDAZOLYL OR PYRIDYL CONTAINING ESTER

**Isao Watanabe, Toyama; Kaishu Momonoi, Shinminato; Toru Hiraiwa, Toyama; Satoshi Ono, Toyama; Joji Nakano, Toyama; Katsuyuki Nagumo, Kawasaki, and Hiroyasu Takagi, Toyama, all of Japan, assignors to Toyama Chemical Co., Ltd., Tokyo, Japan**

**Filed Jun. 21, 1985, Ser. No. 747,305**
**Claims priority, application Japan, Jun. 25, 1984, 59-130645; Jan. 7, 1985, 60-497; Feb. 26, 1985, 60-37130**
**Int. Cl.[4] A61K** *31/455;* **C07D** *401/10, 401/12, 401/14*
**U.S. Cl. 514—332** **36 Claims**

**1**. A 1,4-dihydropyridine represented by the formula (I) or a pharmaceutically acceptable salt thereof:



(I)

wherein $R^1$ and $R^5$, which are the same or different, represent lower alkyl groups; $R^2$ represents an imidazolyl or pyridyl group; $R^3$ represents a phenyl group or a phenyl group substituted by at least one substituent selected from the group consisting of halogen atoms and nitro, cyano, azido, lower alkyl, lower alkoxy, trihalo-lower alkyl, lower alkanesulfonyl, benzyl, phenethyl, methylbenzyl, chlorobenzyl, methoxybenzyl, phenyl, naphthyl, benzyloxy, phenethyloxy, p-chlorobenzyloxy, p-methoxybenzyloxy, phenoxy, naphthoxy, p-methylphenoxy, lower alkylthio, phenylthio, naphthylthio, p-methylphenylthio, benzylthio, phenethylthio, p-chlorobenzylthio, p-methoxybenzylthio and lower alkoxycarbonyl groups; $R^4$ represents a carboxyl group esterified with a group selected from the group consisting of lower alkyl, lower alkoxy-lower alkyl, lower alkylthio-lower alkyl, N,N-di(lower alkyl)amino-lower alkyl, N-benzyl-N-lower alkylamino-lower alkyl, N-(4-chlorobenzyl)-N-lower alkylamino-lower alkyl, N-phenyl-N-lower alkylamino-lower akyl and N,N-dibenzylamino-lower alkyl; A represents an alkylene, alkyleneoxyalkylene or alkylenethioalkylene group; B represents an alkylene or alkenylene group or a direct bond; X represents an oxygen or sulfur atom or a group of the formula

in which $R^6$ represents a hydrogen atom or a lower alkyl, phenyl, naphthyl, benzyl, phenethyl, methylbenzyl, chlorobenzyl or methoxybenzyl group; Y represents an oxygen or sulfur atom or a vinylene group; and Z represents an oxygen or sulfur atom or an alkylene group.

**36**. A vasodilator or platelet aggregation inhibitor which comprises an effective amont of a compound or its pharmaceutically acceptable salt as claimed in claim **1**, in combination with a pharmaceutically acceptable excipient, carrier or diluent.

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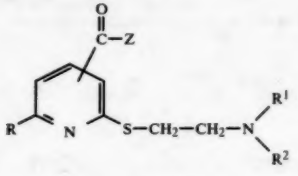
**4,713,388**

## CERTAIN 3- OR 4-BENZOYL-2-[(2-AMINOETHYL)THIO-PYRIDINES] AND THEIR ANTI-ULCER PROPERTIES

**Elemer Ezer; Kalman Harsanyi; Hajnalka V. Pethö; Judit Matuz; Laszlo Szporny; Eszter Cholnoky; Csaba Kuthi; Ferenc Trischler; Bela Hegedüs; Marta Kapolnas, and Anna Kallay, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary**

**Filed Oct. 3, 1985, Ser. No. 783,875**
**Claims priority, application Hungary, Oct. 5, 1984, 3775/84**
**Int. Cl.[4] C07D** *213/50, 213/70;* **A61K** *31/44*
**U.S. Cl. 514—346** **5 Claims**

**1**. A compound of the Formula (I)

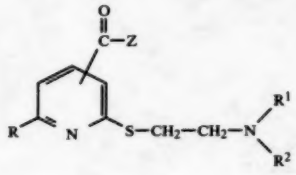


wherein
R is hydrogen or $C_1$ to $C_4$ alkyl;
Z is phenyl, 4-chloro-phenyl, or 2,5-dimethyl-phenyl;
$R^1$ and $R^2$ are each an

group; and
the

substituent is bonded to the 3- or 4-position of the pyridine ring; or a pharmaceutically acceptale acid addition salt thereof.

**3**. A gastrocytoprotective method of preventing ulcers which comprises the step of administering to a mammalian subject susceptible to gastric ulceration, a therapeutically effective amount of a compound of the Formula (I)



wherein

R is hydrogen or $C_1$ to $C_4$ alkyl;

Z is phenyl, 4-chloro-phenyl, or 2,5-dimethyl-phenyl;

$R^1$ and $R^2$ are each hydrogen, $C_1$ to $C_4$ alkyl, $C_1$ to $C_4$ alkyl phenyl, or an

group; and

the

substituent is bonded to the 3- or 4-position of the pyridine ring; or a pharmaceutically acceptable acid addition salt thereof.

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**4,713,389**

## FUNGICIDALLY AND BACTERICIDALLY ACTIVE ACYLATED SACCHARIN DERIVATIVES

**Herbert Salzburg; Manfred Hajek, both of Cologne; Hermann Hagemann, Leverkusen; Engelbert Kühle, Bergisch-Gladbach; Wolfgang Führer, Hennef; Gerd Hänssler, Leverkusen; Wilhelm Brandes, Leichlingen, and Paul Reinecke, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

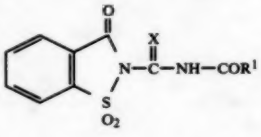
**Filed Sep. 10, 1985, Ser. No. 774,271**

**Claims priority, application Fed. Rep. of Germany, Sep. 12, 1984, 3433391**

**Int. Cl.**[4] **A01N** *47/38;* **C07D** *275/06*

**U.S. Cl. 514—373** **12 Claims**

**1**. An acylated saccharin of the formula



in which

X is oxygen or sulphur,

$R^1$ is carbon atoms, halogenoalkyl or halogenoalkoxy with in each case 1 to 6 carbon atoms and 1 to 5 halogen atoms, alkoxy or alkylthio with in each case 1 to 10 carbon atoms, or unsubstituted aryl, aryloxy or arylthio with in each case 6 or 10 carbon atoms, or aryl, aryloxy or arylthio with in each case 6 or 10 carbon atoms each of which is mono-, di-, tri, tetra- or penta-substituted by halogen, alkoxy with 1 to 4 carbon atoms, alkoxycarbonyl with 1 to 4 carbon atoms and/or N-halogenoalkyl-N-halogenoalkylthioamine with 1 to 3 carbon atoms and 1 to 5 halogen atoms per halogenoalkyl radical; or is cycloalkoxy with 3 to 6 carbon atoms or $—NR^3R^4$,

$R^3$ is alkyl with 1 to 8 carbon atoms, and

$R^4$ is alkyl with 1 to 4 carbon atoms, phenyl, halogenoalkylthio with 1 to 4 carbon atoms and 1 to 5 halogen atoms, alkoxycarbonyl with 1 to 4 carbon atoms in the alkoxy part or phenoxycarbonyl, or $—NR^3R^4$ is a saccharin radical.

**11**. A method of combating fungi and bacteria which comprises applying thereto or to a habitat thereof a fungicidally or bactericidally effective amount of an acylated saccharin according to claim **1**.

**12**. The method according to claim **11**, wherein the acylated saccharin is

N-(1,3-dichloroisopropyl-2-oxycarbonyl-aminocarbonyl)-saccharin,

N-(n-butyl-phenylaminocarbonylamino carbonyl)-saccharin,

N-(phenoxycarbonylaminocarbonyl)-saccharin,

N-(n-butoxycarbonylaminocarbonyl)-saccharin or

N-[2-(N-trifluoromethyl-N-dichloro-fluoromethylthioamino)-phenyl carbonyl-aminocarbonyl)-saccharin.

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**4,713,390**

## SULFURATED HYDANTOIN DERIVATIVES AND PHARMACEUTICAL COMPOSITIONS CONTAINING SAME

**Pierre Dumont, Gembloux, and Jacques Poupaert, Louvain-a-Neuve, both of Belgium, assignors to Region Wallonne, Brussels, Belgium**

**PCT No. PCT/BE85/00007, § 371 Date Dec. 20, 1985, § 102(e) Date Dec. 20, 1985, PCT Pub. No. WO85/05103, PCT Pub. Date Nov. 21, 1985**

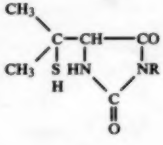
**PCT Filed Apr. 16, 1985, Ser. No. 821,736**

**Claims priority, application Belgium, Apr. 27, 1984, 899531**

**Int. Cl.**[4] **C07D** *235/30;* **A61K** *31/415*

**U.S. Cl. 514—389** **7 Claims**

**1**. A compound of the formula:



wherein R represents a lower alkyl group containing from 1 to 6 carbon atoms, a lower cycloalkyl group containing from 3 to 7 carbon atoms, or an aryl group with 6 carbon atoms, as well as their physiologically acceptable salts, their optical isomers, their mixtures and their racemic compounds.

**6**. A process for treating evolutive chronic polyarthritis which comprises administering an effective amount of a compound of any one of claims **1** to **3**.

**4,713,391**

## AZABICYLOALKANE PHENYL SUBSTITUTED ALKANE CARBOXYLATES, THEIR PREPARATION AND USE AS ANTICHOLINERGIC AGENTS

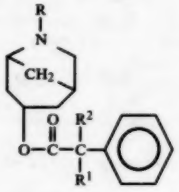
**Peter K. Chiang, Bethesda; Michelle M. Richard, Silver Spring; Felipe N. Padilla, Wheaton, all of Md.; Frank I. Carroll, Durham, and Philip Abraham, Cary, both of N.C., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C. and Research Triangle Institute, Research Triangle, N.C.**

**Filed Apr. 17, 1986, Ser. No. 855,857**

**Int. Cl.[4] C07D** *209/02;* **H61K** *31/40*

**U.S. Cl. 514—412** **11 Claims**

**1.** An azabicycloalkane phenyl substituted alkane carboxylate compound having the formula



wherein R represents lower alkyl groups having 1 to 7 carbon atoms; $R^1$ represents hydrogen, phenyl, cyclohexyl, and cyclopentyl; and $R^2$ represents lower alkyl groups having 1 to 7 carbons, hydroxymethyl, and hydroxyl; and pharmaceutically acceptable acid addition salts thereof.

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**4,713,392**

## PESTICIDES

**Michael Elliott, Stevenage; Norman F. Janes, Luton, and Bhupinder P. S. Khambay, Harrow Weald, all of England, assignors to National Research Development Corporation, England**

**Filed May 10, 1985, Ser. No. 732,642**

**Claims priority, application United Kingdom, May 16, 1984, 8412480**

**Int. Cl.[4] A61K** *31/275;* **C07C** *49/657*

**U.S. Cl. 514—464** **8 Claims**

**1.** A compound of formula I

$$R_A CH_2 COCHDR_B \qquad I$$

in which formula:

$R_A$ represents a group $ArCR_1R_2$— in which Ar represents a phenyl or naphthyl group optionally substituted by one or more halogen, alkoxy, haloalkoxy, methylenedioxy or $C_1$–$C_6$ alkyl or haloalkyl groups;

$R_1$ and $R_2$ together with the carbon to which they are attached jointly represent a $C_3$–$C_6$ cycloalkyl group optionally substituted by one or more halogen atoms or $C_1$–$C_6$ cycloalkyl groups and

$R_B$ is phenyl, chloro- or fluorophenyl substituted by phenoxy, benzyl or benzoyl and D is hydrogen or cyano.

**7.** A pesticidal composition which comprises a compound according to claim **1** of formula I formulated with an inert carrier or diluent.

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**4,713,393**

## PHENYLPROPYL-2,3-DIHYDROBENZOFURANS USEFUL AS ANTI-INFLAMMATORY AGENTS

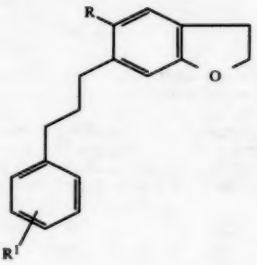
**Michael N. Chang; Kathryn L. Thompson, both of Westfield, and David A. Boulton, Edison, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed Apr. 25, 1985, Ser. No. 727,317**

**Int. Cl.[4] A61K** *31/34;* **C07D** *307/79*

**U.S. Cl. 514—469** **19 Claims**

**1.** A compound of formula:



or a pharmaceutically acceptable salt thereof wherein

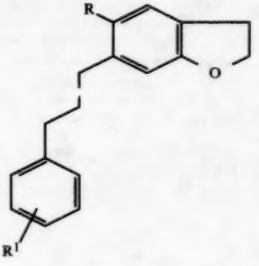
$R^1$ is

(1) hydrogen;
(2) halo;
(3) loweralkoxy;
(4) lower alkylthio;
(5) lower alkyl sulfinyl;
(6) lower alkyl sulfonyl;
(7) phenylloweralkoxy;
(8) loweralkyl;
(9) loweralkenyl;
(10) lower alkanoyl;
(11) halololoweralkyl;
(12) —COOH;
(13) phenyl;
(14) phenoxy;
(15) cyano;
(16) hydroxyloweralkyl;
(17) halo loweralkanoyl;
(18) loweralkanoyloxy:
(19) hydroxy; or
(20) loweralkanoyl or halololoweralkanoyl-loweralkyl;

R is

(1) hydroxy;
(2) loweralkoxy;
(3) phenyl loweralkoxy; or
(4) loweralkanoyloxy.

**17.** A method of treating or decreasing inflammation comprising the administration to a mammalian species in need of such treatment a therapeutically effective amount of a compound of formula



or a pharmaceutically acceptable salt thereof wherein

$R^1$ is

(1) hydrogen;
(2) halo;
(3) loweralkoxy;
(4) lower alkylthio;
(5) lower alkyl sulfinyl;
(6) lower alkyl sulfonyl;
(7) phenylloweralkoxy;
(8) loweralkyl;

(9) loweralkenyl;
(10) lower alkanoyl;
(11) haloloweralkyl;
(12) —COOH;
(13) phenyl;
(14) phenoxy;
(15) cyano;
(16) hydroxyloweralkyl;
(17) halo loweralkanoyl;
(18) loweralkanoyloxy,
(19) hydroxy; or
(20) loweralkanoyl or haloloweralkanoyl-loweralkyl;

R is
(1) hydroxy;
(2) loweralkoxy;
(3) phenyl loweralkoxy; or
(4) loweralkanoyloxy.

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4,713,394

## TREATMENT OF NONACNE INFLAMMATORY AND INFECTIOUS DERMATOSES AND HAIR LOSS

Carl R. Thornfeldt, 1054 NW. 2nd Ave., Ontario, Oreg. 97914

Continuation-in-part of Ser. No. 820,472, Jan. 17, 1986, abandoned. This application Jun. 11, 1986, Ser. No. 873,859
Int. Cl.[4] A61K *31/19*
U.S. Cl. 514—574 5 Claims

1. A method for the treatment of skin suffering from a condition selected from the group consisting of nonacne inflammatory dermatoses, infectious cutaneous disease, and inflammatory and hormone hair loss, said method comprising applying to the affected area a therapeutically effective amount of azelaic acid.

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4,713,395

## ACETOHYDROXAMIC ACID DERIVATIVE

Louis Lafon, Paris, France, assignor to Societe Anonyme Dite: Laboratoire L. LaFon, Maisons Alfort, France

Filed Jul. 30, 1986, Ser. No. 890,561
Claims priority, application France, Jul. 31, 1985, 85 11685
Int. Cl.[4] A61K *31/04, 31/085, 31/185;* C07C *83/10*
U.S. Cl. 514—575 3 Claims

1. 2-(5-Chloro-4-nitro-2-methoxybenzamido)acetohydroxamic acid.

3. A method for treating a patient suffering from overexcitement, which comprises administering to such a patient a pharmaceutically effective amount of 2-(5-chloro-4-nitro-2-methoxybenzamido)acetohydroxamic acid according to claim 1.

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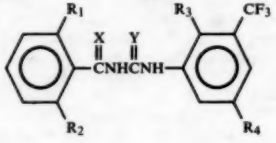
4,713,396

## BENZOYLUREA DERIVATIVES

Katsuyata Ikura, Ninomiya; Kenji Hagiwara; Fumihiko Nagasaki, both of Odawara; Tomio Yamada; Hidemitsu Takahashi, both of Hiratsuka, and Renpei Hatano, Ohiso, all of Japan, assignors to Nippon Soda Co., Ltd., Tokyo, Japan

Filed Sep. 9, 1985, Ser. No. 773,933
Claims priority, application Japan, Sep. 20, 1984, 59-195804
Int. Cl.[4] C07C *157/12, 127/22;* A01N *47/34*
U.S. Cl. 514—594 12 Claims

1. A compound having the formula




wherein
$R_1$ represents halogen or methyl;
$R_2$ represents hydrogen or halogen;
each of $R_3$ and $R_4$ represents halogen; and
each of X and Y represents oxygen or sulfur but both are not sulfur.

7. An insecticidal composition comprising an inert carrier and an effective amount of a compound of claim 1.

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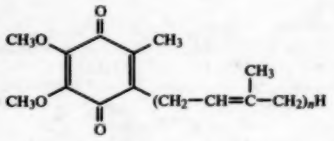
4,713,397

## COMPOSITION FOR REDUCING NATURAL HAIR FALL-OUT

Shinichi Hirama, Kanagawa; Toshio Nishiyama, Tokyo; Youichi Ohta; Makoto Uzuka, both of Kanagawa; Kenichi Tomita, Tokyo; Keisuke Nakajima, Kanagawa, and Kazumaro Furuse, Tokyo, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 513,276, Jul. 13, 1983, abandoned. This application Aug. 26, 1985, Ser. No. 768,931
Claims priority, application Japan, Jul. 15, 1982, 57-123527
Int. Cl.[4] A61K *31/12*
U.S. Cl. 514—690 4 Claims

1. A method of reducing natural fall-out of hair on a human, which comprises topically applying to the human an effective amount of a ubiquinone of the formula:




wherein n represents an integer of from 7 to 10.

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4,713,398

## NATURALLY-DERIVED CAROTENE/OIL COMPOSITION

Arthur M. Nonomura, Del Mar, Calif., assignor to Microbio Resources, Inc., San Diego, Calif.

Filed Aug. 30, 1985, Ser. No. 771,401
Int. Cl.[4] A61K *31/07, 31/40, 31/355*
U.S. Cl. 514—725 16 Claims

1. A composition consisting essentially of naturally-derived carotene dispersed in a non-petroleum, naturally-derived edible oil, wherein said carotene is present as 1–5 weight percent of said composition.

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4,713,399

## FLEXIBLE POLYURETHANE FOAMS PREPARED FROM POLY(ALKYLENE CARBONATE) POLYOLS

Daniel D. Webb, Lake Jackson, Tex., and Donald G. Prier, Baton Rouge, La., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 30, 1985, Ser. No. 814,850
Int. Cl.[4] C08G *18/14*
U.S. Cl. 521—110 13 Claims

1. A polyurethane foam which is the reaction product of a reaction mixture comprising a poly(alkylene carbonate) polyol, a silicone surfactant, a blowing agent and a polyisocyanate, wherein the poly(alkylene carbonate) polyol is a polymer of an oxirane and carbon dioxide or a cyclic alkylene carbonate, said polymer having a carbon dioxide content of about 5–25% by weight and an equivalent weight from about 100 to 3000.

4,713,400

## FOAMING SYSTEM FOR PHENOLIC FOAMS

Leon M. Zwolinski, Orchard Park, and Frank J. Dwyer, Buffalo, both of N.Y., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Division of Ser. No. 811,185, Dec. 20, 1985. This application May 19, 1986, Ser. No. 864,657

Int. Cl.[4] C08J 9/14

U.S. Cl. 521—131 3 Claims

1. A mixture comprising a foamable rigid phenol formaldehyde resin and a fluorocarbon blowing agent system comprising a blend of wherein said blowing agent is selected from blends of (a) a fluorocarbon consisting of trichlorotrifluoroethane (CFC-113) and mixtures thereof with (b) dichlorotrifluoroethane, CFC-123 or CFC-123a, and mixtures thereof in a ratio of CFC-123 or CFC-123a to CFC-113 of about 1:9 to about 3:7 and wherein the total blowing agent is present in amounts of from about 2 to 40 parts by weight based on the weight of the phenol formaldehyde resin.

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4,713,401

## TITANOCENES AND A RADIATION-POLYMERIZABLE COMPOSITION CONTAINING THESE TITANOCENES

Martin Riediker, Gstaltenrainweg 75, 4125 Riehen; Kurt Meier, Ulmenstrasse 11, 4123 Allschwil, and Hans Zweifel, Leuengasse 4, 4057 Basle, all of Switzerland

Filed Dec. 11, 1985, Ser. No. 807,565

Claims priority, application Switzerland, Dec. 20, 1984, 6051/84

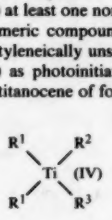
Int. Cl.[4] C08F 2/50, 4/76; C08L 33/14

U.S. Cl. 522—65 10 Claims

1. A composition which is polymerizable upon irradiation which comprises

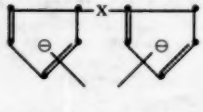
(a) at least one non-volatile monomeric, oligomeric or polymeric compound having at least one polymerizable ehtyleneically unsaturated double bond, and

(b) as photoinitiator, an effective amount of at least one titanocene of formula I



(I)

in which the two $R^1$ idependently of one another are unsubstituted or substituted cyclopentadienyl$^{\ominus}$, indenyl$^{\ominus}$ or 4,5, 6,7-tetrahydroindenyl$^{\ominus}$, or both $R^1$ together are an unsubstituted or substituted radical of the formula II



(II)

in which X is $-(CH_2)_n$ with n=1, 2 or 3, alkylidene having 2 to 12 C atoms, cycloalkylidene having 5 to 7 ring carbon atoms, $SiR_2^4$ or $SnR_2^4$, and $R^4$ is $C_1$–$C_{12}$-alkyl, $C_5$–$C_{12}$-cycloalkyl, $C_6$–$C_{16}$-aryl or $C_7$–$C_{16}$-aralkyl, $R^2$ is a 6-membered carbocyclic aromatic ring which is substituted in at least one of the two ortho-positions relative to the metal-carbon bond by $-CF_2Z$, in which Z is F or unsubstituted or substituted alkyl, or and $R^3$ is as defined for $R^2$ or is halogen, pseudohalogen.

4,713,402

## PROCESS FOR PREPARING ANTITHROMBOGENIC/ANTIBIOTIC POLYMERIC PLASTIC MATERIALS

Donald D. Solomon, Spring Valley, Ohio, assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Aug. 30, 1985, Ser. No. 771,438

Int. Cl.[4] A61K 17/18; B44D 5/12

U.S. Cl. 523—112 14 Claims

1. A process for producing plastic substrates having antithrombogenic and/or antibiotic properties without dissolving the substrate, characterized by

(a) providing a dual organic solvent system, said dual organic solvent system comprising

(1) a chlorofluorocarbon component, said chlorofluorocarbon component being a member selected from the group consisting of 1,1,2-trichloro-1,2,2-trifluoroethane; 1,2-difluoro-1,1,2,2-tetrachloroethane; 1,1-difluoro 1,2,2,2-tetrachloroethane, and mixtures thereof;

(2) a petroleum ether component; and

(3) the ratio of said chlorofluorocarbon component to said petroleum ether component being within the range of between about nine parts chlorofluorocarbon to one part petroleum ether and one part chlorofluorocarbon to one part petroleum ether;

(b) dissolving in said dual organic solvent system from said providing step a pre-formed quaternary ammonium antibiotic and/or antithrombogenic complex;

(c) immersing a plastic material in said dual organic solvent system containing said quaternary ammonium antibiotic and/or antithrombogenic complex from said dissolving step, said plastic material being non-dissolvable in said organic solvent system;

(d) removing in a first removing step said plastic material from said immersing step; and

(e) removing in a second removing step said solvent from said dissolving step;

(f) thereby providing a passively coated thin layer film of quaternary ammonium antibiotic and/or anticoagulant complex on said plastic surface.

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4,713,403

## DENTAL COMPOSITE RESIN COMPOSITION

Bunsaku Yoshida, Ichikawa, and Kentaro Tomioka, Chofu, both of Japan, assignors to G-C Dental Industrial Corporation, Tokyo, Japan

Filed Mar. 24, 1986, Ser. No. 843,195

Claims priority, application Japan, Apr. 2, 1985, 60-68533

Int. Cl.[4] A61K 6/08

U.S. Cl. 523—115 14 Claims

1. A dental composite resin composition comprising as main components a polymerizable monomer, which is a monofunctional or polyfunctional acrylate or methacrylate, an inorganic filler and/or an organic filler, a gold powder and/or a gold-color alloy powder having a gold-color luster, and a redox polymerization catalyst.

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4,713,404

## PAINT FORMULATION COMPRISING A THERMALLY STABLE CAPPED THERMOPLASTIC PHENOLIC RESIN

Michael B. Cavitt, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 755,260, Jul. 15, 1985, Pat. No. 4,632,971. This application Sep. 15, 1986, Ser. No. 907,566

Int. Cl.[4] C08K 5/41

U.S. Cl. 523—172 6 Claims

1. A paint formulation comprising

(I) a thermally stable, thermoplastic phenolic resin prepared by reacting

(A)

(1) the reaction product of

(a) at least one epoxy resin having an average of more than one vicinal epoxy group per molecule with

(b) one or more polyhydric phenols; and optionally

(B)

(2) one or more polyhydric phenols; with

(B) a material having only one vicinal epoxy group per molecule or mixture of such materials;

in the presence of an effective quantity of a suitable catalyst and wherein the components are present in quantities which provide an equivalent ratio of component (A-1-a) to component (A-1-b) of from about 0.7:1 to about 0.95:1, the ratio of phenolic hydroxyl equivalents of component (A-2) to the phenolic hydroxyl equivalents of component (A-1) is from about 0:1 to about 20:1, and the ratio of epoxy equivalents from component (B) to phenolic hydroxyl equivalents in component (A) is from about 0.9:1 to about 1.1:1; and

(II) at least one of

(A) one or more pigments;

(B) one or more dyes;

(C) one or more fillers; or

(D) any combination thereof.

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## 4,713,405
## α-CYANOACRYLATE ADHESIVE COMPOSITION OF MATTER

**Mitsuyuki Koga; Kenichiro Hirai; Toshio Sugimae, and Setsuo Fukushige, all of Sakura, Japan, assignors to Koatsu Gas Kogyo Co., Ltd., Osaka, Japan**

**Filed Jun. 27, 1986, Ser. No. 879,380**

**Claims priority, application Japan, Jul. 19, 1985, 60-160903**

**Int. Cl.[4] C08K** *9/04, 5/55*

**U.S. Cl. 523—212** **4 Claims**

1. An α-cyanoacrylate adhesive composition of matter consisting essentially of α-cyanoacrylate, fumed silica having a surface treated with a dimethyldichlorosilane, and trialkyl borate, said trialkyl borate being represented by the general formula $B(OR)_3$ wherein R represents any alkyl group having 1 through 18 carbon atoms contained therein.

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## 4,713,406
## BINDERS FOR CATHODIC ELECTROCOATING

**Eberhard Schupp, Schwetzingen; Rolf Osterloh, Gruenstadt; Werner Loch, Erpolzheim, and Klaas Ahlers, Muenster, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Nov. 25, 1986, Ser. No. 934,623**

**Claims priority, application Fed. Rep. of Germany, Nov. 29, 1985, 3542170**

**Int. Cl.[4] C08L** *63/02*

**U.S. Cl. 523—415** **8 Claims**

1. A binder for cathodic electrocoating which is based on polyadducts/polycondensates which carry basic nitrogen groups and are rendered water-dilutable by protonation with an acid, and one or more crosslinking agents for these polyadducts/polycondensates, and essentially consists of a mixture of

(A) from 50 to 90% by weight of a polyadduct/polycondensate which carries basic nitrogen groups and is obtainable by reacting

(a) an essentially epoxide-free adduct of a secondary amine and polyepoxide compound with

(b) a condensate of a diamine/polyepoxide adduct which is prepared in the presence of excess diamine and separated off from excess diamine after complete conversion of the epoxide groups, with one or more mono- and/or dicarboxylic acids of not less than 6 carbon atoms, with the proviso that the reaction of (a) with (b) is carried out at about 100°–250° C., and

(B) from 10 to 50% by weight of a crosslinking agent which does not react with component (A) at room temperature but reacts with the latter at elevated temperatures with crosslinking,

the sum of the percentages stated under (A) and (B) being 100.

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## 4,713,407
## FLAME RETARDANT POLYESTER RESIN COMPOSITION

**Philip E. Bailey, Worthington; Gordon E. Pickett, Reynoldsburg; Manfred Luttinger, Columbus, all of Ohio, and Takashi Umeda, Ichihara, Japan, assignors to Idemitsu Petrochemical Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 824,449, Jan. 31, 1986, abandoned. This application Jul. 7, 1986, Ser. No. 882,587**

**Int. Cl.[4] C08K** *5/15*

**U.S. Cl. 524—109** **10 Claims**

1. A polyester resin composition comprising: 100 parts by weight of a polyethylene terephthalate polyester resin (A) having an inherent viscosity of not less than 0.55 to 1.0 dl/g, from 20 to 70 parts by weight of glass fibers having a length of from 0.1 to 6 millimeter (B), from 2 to 8 parts by weight of a crystallization-accelerating agent selected from the group consisting of talc having an average particle diameter of from 0.5 to 10 micron, an ionomer having a melt index of from 0.5 to 5 gram per 10 minutes and a mixture thereof (C), from 10 to 25 parts by weight of a flame retardant selected from the group consisting of tetrachlorobisphenol A oligomer, halogenated polycarbonate oligomer, terminal epoxy compound of tetrabromobisphenol A oligomer, halogenated polystyrene and poly(dibromophenylene oxide) (D) and, as an auxiliary flame retardant, from 2 to 8 parts by weight of an antimony trioxide, and from 3 to 10 parts by weight of zinc borate (E).

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## 4,713,408
## POLYBUTYLENE TEREPHTHALATE RESIN COMPOSITION

**Katsuhiko Takahashi, and Yoshihisa Tajima, both of Fuji, Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan**

**Filed Dec. 20, 1985, Ser. No. 811,561**

**Claims priority, application Japan, Dec. 21, 1984, 59-270315**

**Int. Cl.[4] C08K** *5/42, 5/04, 5/09;* **C08L** *67/02*

**U.S. Cl. 524—161** **5 Claims**

1. A polybutylene terephthalate resin composition which comprises polybutylene terephthalate, a sulfonate anionic antistatic agent and an oxidized polyolefin wax formed by thermally cracking polyolefins in an oxidizing atmosphere or by introduction of polar radicals during polymerization.

5. A polybutylene terephthalate resin according to claim 1, wherein said anionic antistatic agent is a metal salt of an alkyl sulfonic acid wherein the alkyl radical has 1 to 22 carbon atoms, or a metal salt of an alkyl substituted aromatic sulfonic acid having ah aromatic hydrocarbon nucleus wherein the alkyl radical has 1 to 25 carbon atoms.

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## 4,713,409
## VULCANIZABLE POLYMERIC COMPOSITIONS CONTAINING A ZINC DIMETHACRYLATE ADJUVANT AND METHOD FOR PREPARING THE ADJUVANT

**Robert A. Hayes, Cuyahoga Falls, and Wendell R. Conard, Kent, both of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio**

**Continuation of Ser. No. 653,177, Nov. 7, 1984, abandoned, which is a continuation of Ser. No. 421,012, Sep. 21, 1982, abandoned. This application Apr. 17, 1986, Ser. No. 853,250**

**Int. Cl.[4] C08K** *3/04;* **C08F** *8/00*

**U.S. Cl. 524—518** **14 Claims**

1. Vulcanizable polymeric compositions comprising:

(a) rubbery polymers selected from the group consisting of natural rubber, ethylene/propylene copolymers, ethylene/propylene/diene terpolymers, styrene/butadiene copolymers, nitrile rubbers, neoprene and blends thereof;

(b) from about 25 to about 85 parts by weight per 100 parts by weight of said rubbery polymers of a zinc dimethacry-

late having a surface area of from about 3.7 to about 5.4 $m^2/g$; and

(c) a cure effective amount of a peroxide curing agent.

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4,713,410

**SILICONE RELEASE COATING EMULSIONS WHICH STRATIFY WHEN BAKED**

**John Katchko, Palatine; Karel Kriz, Mt. Prospect, and Thomas H. Plaisance, Wilmette, all of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.**

**Filed Jan. 13, 1986, Ser. No. 818,035**

**Int. Cl.[4] C08J *0/00***

**U.S. Cl. 524—500** **15 Claims**

1. A heat curable aqueous emulsion coating composition adapted to deposit a release coating which stratifies to allow less silicone to effectively coat a given surface area comprising: (1) a fatty acid or fatty alcohol-containing hydroxy-functional polyester containing at least 5% of said fatty material and having a hydroxy value of at least about 40 and which is a free flowing liquid at room temperature; (2) a cross-linking agent for said hydroxy resin; and (3) at least one silicone reactive with said hydroxy-functional resin or said cross-linking agent to provide a release function, said hydroxy-functional polyester and said cross-linking agent serving to emulsify said silicone in the aqueous phase of said emulsion, said emulsion containing water in an amount of from 2% to 35%.

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4,713,411

**PIGMENT COMPOSITION AND PREPARATION PROCESS THEREOF**

**Kazuo Kanou, Satte; Takamitu Shinoda, Kashiwa, and Yukio Kanbara, Warabi, all of Japan, assignors to Dainichiseika Color & Chemicals Mfg. Co., Ltd., Tokyo, Japan**

**Filed Jun. 2, 1986, Ser. No. 869,325**

**Int. Cl.[4] C08J *3/04***

**U.S. Cl. 524—560** **16 Claims**

1. A pigment composition consisting of an intimate mixture of:

75–95 wt. % based on the whole pigment composition of an organic pigment, and

5–25 wt. % based on the whole pigment composition of a polymer made up of 0–40 wt. % of styrene, 20–70 wt. % of a methacrylic ester and 20–50 wt. % of methacrylic acid, wherein the total proportion of styrene, methacrylic ester and methacrylic acid is at least 85 wt. % of the entire monomers.

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4,713,412

**EMULSION POLYMERIZED SEC-BUTYL ACRYLATE LATEXES SUITABLE FOR USE AS PRESSURE SENSITIVE ADHESIVES**

**Ralph G. Czerepinski, Midland, and Roland E. Gunderman, Clare, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Aug. 2, 1985, Ser. No. 762,083**

**Int. Cl.[4] C08L *31/00, 33/00, 35/00***

**U.S. Cl. 524—833** **3 Claims**

1. An emulsion polymerized latex composition suitable for use as a pressure sensitive adhesive comprising: (a) from about 95 to about 97 percent by weight total polymer of sec-butyl acrylate and (b) from about 5 to about 3 percent by weight total polymer of acrylic acid.

4,713,413

**REMOVAL OF ORGANIC HALIDES FROM HYDROCARBON SOLVENTS**

**Bruce R. Tegge, Madison; Frank G. Weary, Westfield, both of N.J., and Yasuo Sakaguchi, Yokahama, Japan, assignors to Exxon Chemical Patents Inc., Linden, N.J.**

**Filed Dec. 27, 1985, Ser. No. 814,100**

**Int. Cl.[4] C08F *8/22***

**U.S. Cl. 525—54** **11 Claims**

1. In a process for halogenating butyl rubber, said rubber including minor amounts of at least one monomer from which said rubber is prepared, the halogenation being carried out by dissolving said rubber in a hydrocarbon solvent and contacting the rubber/solvent solution with a halogen wherein the halogen is chlorine or bromine, whereby said monomers are halogenated incidental to the rubber halogenation to form organic halides, the halogenated rubber being separated from the hydrocarbon solvent and the solvent being recovered for recycling in a subsequent halogenation process, at least a portion of said organic halides being concentrated in said solvent, the improvement which comprises removing substantially all of the organic halides selected from the group consisting essentially of 2-methyl-3-chloropropene-1,2-methyl-1,2-dibromo-3-chloropropane, tribromo isobutane or mixtures thereof from said solvent by contacting said solvent with an activated alumina at a temperature of at least 20° C. for a time sufficient to remove said halides from said solvent.

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4,713,414

**POLYOXYMETHYLENE MOLDING COMPOSITIONS EXHIBITING IMPROVED TOUGHNESS**

**Rajal M. Kusumgar, Livingston, N.J., assignor to Celanese Corporation, New York, N.Y.**

**Filed Jul. 16, 1986, Ser. No. 886,274**

**Int. Cl.[4] C08L *51/00***

**U.S. Cl. 525—64** **10 Claims**

1. An oxymethylene polymer molding composition comprising a normally solid oxymethylene polymer having an inherent viscosity of at least 1.0 (measured at 60° C. in a 0.1 weight percent solution in p-chlorophenol containing 2 wt. % of alpha-pinene), a molecular weight of at least 10,000 and a melting point of at least 150° C., in an amount of from about 50 to about 95 wt. %, based on the weight of the total composition, a reactive titanate selected from the group consisting of neoalkoxy, trineodecanoyl titanate, neoalkoxy, dodecylbenzene-sulfonyl titanate, neoalkoxy, tri(dioctylphosphato) titanate, neoalkoxy, tri(dioctylpyrophosphato) titanate, neoalkoxy, tri(N-ethylaminoethylamino) titanate, and neoalkoxy, tri(m-amino) phenyl titanate, and present in an amount of from about 0.05 to about 5 wt %, based on the weight of the total composition and based on 100% reactivity of the titanate, and a multiphase composite interpolymer in an amount of from about 1 to about 50 wt. %, based on the weight of the total composition.

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4,713,415

**RUBBER MODIFIED NYLON COMPOSITION**

**Richard E. Lavengood, Longmeadow; Allen R. Padwa, Worcester, and Alva F. Harris, Wilbraham, all of Mass., assignors to Monsanto Company, St. Louis, Mo.**

**Continuation-in-part of Ser. No. 733,560, May 10, 1985, abandoned. This application Mar. 21, 1986, Ser. No. 842,338**

**Int. Cl.[4] C08L *77/00***

**U.S. Cl. 525—66** **7 Claims**

1. A polymer blend comprising:

(A) 5 to 79.5 weight percent of a graft rubber composition comprising a graft copolymer of from 15 to 55 parts by weight of acrylonitrile and from 85 to 45 parts by weight of styrene, wherein monomers of acrylonitrile and styrene are polymerized in the presence of an grafted onto a substrate rubber having a glass transition temperature below 0° C., wherein the weight percentage of the rubber is in

the range of from 5 to 80 percent and the weight percentage of the graft copolymer is in the range of 95 to 20 percent of the graft rubber composition;

(B) 94.5 to 20 weight percent of a nylon polyamide resin; and

(C) 0.5 to 60 weight percent of a compatibilizer terpolymer of styrene, acrylonitrile and maleic anhydride capable of reaction with the polyamide resin, having a styrene:acrylonitrile weight ratio of 80:20 to 50:50 and a maleic anhydride content of 0.3 to 1.5 mole percent and wherein said compatibilizer terpolymer is miscible with the graft copolymer of said graft rubber composition;

wherein the percentage weights of components A, B and C are based on the total weight of components A, B and C in the blend.

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## 4,713,416
## THERMOPLASTIC COMPOSITIONS INCLUDING POLYPHENYLENETHER, HAVING IMPROVED IMPACT STRENGTH AND PROCESSABILITY CHARACTERISTICS

**Luciano Del Giudice, Milan; Roberto Nocci, Novara; Umberto Giannini, Milan, and Giuseppe Gianotti, Novara, all of Italy, assignors to Montedison S.p.A., Milan, Italy**

**Filed Nov. 14, 1984, Ser. No. 671,314**

**Claims priority, application Italy, Nov. 15, 1983, 23717 A/83**

**Int. Cl.⁴ C08L** *61/04, 71/04*

**U.S. Cl. 525—68** **2 Claims**

1. A thermoplastic composition consisting essentially of 60% by weight of poly-2,6-dimethyl-1,4 phenylenether, 30% by weight of a blend of polypropylene with an ethylene/propylene rubber and 10% by weight of a graft copolymer of styrene onto polypropylene.

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## 4,713,417
## POLYMERS FORMED FROM ALLYL-SUBSTITUTED OR METHALLYL-SUBSTITUTED, BICYCLIC, UNSATURATED DICARBOXYLIC ANHYDRIDES

**Alfred Renner, Muntelier; Theobald Haug, Frenkendorf, and Bruno Schreiber, Aesch, all of Switzerland, assignors to Ciba-Geigy Corp., Ardsley, N.Y.**

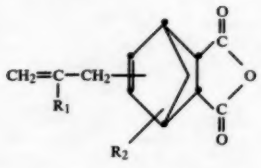
**Continuation of Ser. No. 694,582, Jan. 24, 1985, abandoned. This application Jan. 5, 1987, Ser. No. 4,251**

**Claims priority, application Switzerland, Jan. 31, 1984, 448/84**

**Int. Cl.⁴ C08F** *124/00;* **C08L** *63/02*

**U.S. Cl. 525—117** **6 Claims**

1. A curable mixture containing a polymer obtained by the polymerization solely of a monomer or a mixture of monomers of the formula I



(I)

in which $R_1$ and $R_2$ independently of one another are hydrogen or methyl; and a separately added polyepoxide compound containing on average more than one epoxide group in the molecule.

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## 4,713,418
## BLENDS OF FLUOROPLASTICS AND FLUOROELASTOMERS

**Anestis L. Logothetis, Wilmington, and Charles W. Stewart, Newark, both of Del., assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.**

**Filed Dec. 6, 1985, Ser. No. 805,543**

**Int. Cl.⁴ C08L** *27/16, 27/18, 27/20*

**U.S. Cl. 525—200** **17 Claims**

1. A melt blended composition comprising (A) 100 parts by weight of a cured fluoroelastomer consisting essentially of from 79.9 to 52 mole % units derived from tetrafluoroethylene, 20 to 45 mole % units derived from a perfluoroalkylvinyl ether wherein the alkyl group contains from 1 to 10 carbon atoms, and 0.1 to 4.0 mole % cure site monomer units derived from vinyldiene fluoride, trifluoroethylene, vinyl fluoride, $CH_2{=}CHR_f$ where $R_f$ is a perfluoroalkyl group containing from 1 to 5 carbon atoms, perfluorophenoxy substituted perfluoroalkylene vinyl ethers wherein the perfluoroalkylene group contains from 1 to 5 carbon atoms, $N{=}C(R'_f{-}O)_nCF{=}CF_2$ where $R'_f$ is a perfluoroalkylene group of 2 or 3 carbon atoms and n is 1–4, fluoroolefins of 2 to 5 carbon atoms containing 1 or 2 bromo substitutents or fluoroolefins of 2 to 5 carbon atoms, containing 1 or 2 iodo substituents, (B) and from 2 to 50 parts by weight of a thermoplastic perfluorocarbon copolymer containing at least 50 mole % units derived from tetrafluoroethylene having a melting point above 300° C. which is present as generally spherical particles having a particle size of less then about 10 microns, said composition being melt blended at a temperature which is sufficiently high to melt the thermoplastic tetrafluoroethylene copolymer.

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## 4,713,419
## THERMOPLASTIC OLEFIN ELASTOMER

**Masahiro Takimoto, Mie; Junji Takeuchi, Nagoya, and Yoshio Yamazaki, Aichi, all of Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan**

**Filed Apr. 30, 1986, Ser. No. 857,308**

**Claims priority, application Japan, Apr. 30, 1985, 60-93226**

**Int. Cl.⁴ C08L** *23/10, 23/16, 23/08*

**U.S. Cl. 525—211** **4 Claims**

1. A thermoplastic olefin elastomer of polyblend which comprises 30 to 70 wt% of ethylene-propylene-diene terpolymer (EPDM), 10 to 30 wt% of ethylene-vinyl acetate copolymer (EVA), and 20 to 50 wt% of polypropylene (PP), said EPDM having a Mooney viscosity $ML_{1+4}$ (100° C.) of 60 to 100 and containing 20 to 40 wt% of propylene and ethylidenenorbornene as a third component, said EVA containing 10 to 30 wt% of vinyl acetate and having an $\overline{M}n$ of 13,500 to 17,000, and said PP having an $\overline{M}n$ of 30,000 to 110,000.

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## 4,713,420
## ABS COMPOSITIONS HAVING TRIMODAL RUBBER PARTICLE DISTRIBUTIONS

**David E. Henton, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed May 21, 1982, Ser. No. 380,786**

**Int. Cl.⁴ C08L** *47/00, 51/04, 55/02*

**U.S. Cl. 525—236** **10 Claims**

1. An improved rubber-modified, impact-resistant polymeric composition comprising:

(a) a matrix comprising an interpolymer comprising monovinylidene aromatic monomer and ethylenically unsaturated nitrile monomer polymerized therein; and

(b) dispersed in such matrix in the form of discrete particles, from about 5 to about 40 weight percent, based on weight polymeric composition, of elastomeric material (rubber), wherein the improvement comprises the dispersed rubber comprising the following three rubber components;

(1) a small particle rubber component being from about 1 to about 94 weight percent of the rubber, the particles

of this component having a volume average diameter of from about 0.05 to about 0.25 microns (μ);

(2) a large emulsion particle rubber component being from about 1 to about 80 weight percent of the rubber, the particles of this component having a volume average diameter of from about 0.4 to about 2μ produced by emulsion polymerization; and

(3) a large mass particle rubber component being from about 5 to about 95 weight percent of the rubber, the particles of this component having a volume average diameter of from about 0.5 to about 10μ produced by mass, mass-solution or mass-suspension polymerization.

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## 4,713,421

## PROCESS FOR OBTAINING NARROW MOLECULAR WEIGHT DISTRIBUTION IN VINYL AROMATIC MASS POLYMERIZATION SYSTEM

**Richard A. Hall, Naperville, and Jeffrey I. Rosenfeld, Schaumburg, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.**

**Continuation of Ser. No. 373,118, Apr. 29, 1982, abandoned, which is a continuation of Ser. No. 186,897, Sep. 15, 1980, abandoned. This application May 10, 1984, Ser. No. 608,774**

**Int. Cl.[4] C08F *2/40***

**U.S. Cl. 525—242** **10 Claims**

1. A process for free radical mass polymerization of a mixture of vinyl aromatic monomer containing 0 to about 20 wt.% polybutadiene or styrene/butadiene rubber comprising polymerizing such mixture in successive stages with increasing temperature and agitation and incorporating a polymerization inhibiting agent into the resulting polymerizing mixture at a point where 60 to about 95% of monomer is converted to polymer, such inhibiting agent incorporated at a level at which polymerization continues, whereby the molecular weight distribution of the resulting polymer is reduced.

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## 4,713,422

## RADIATION-SENSITIVE POLYMERS WHICH FORM A METAL COMPLEX, PROCESS FOR THE POLYMERIZATION OF ACETYLENE, AND COATED MATERIAL

**Jürgen Kaschig, Freiburg, and Jürgen Finter, Freiburg, both of Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation of Ser. No. 712,292, Mar. 15, 1985, abandoned. This application Jul. 22, 1986, Ser. No. 889,585**

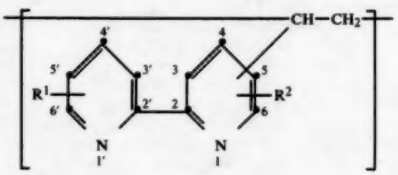
**Claims priority, application Switzerland, Mar. 23, 1984, 1467/84**

**Int. Cl.[4] C08F *126/06, 226/06***

**U.S. Cl. 525—326.7** **6 Claims**

1. A polymer which has a mean molecular weighb of 1,000 to 5,000,000 and contains

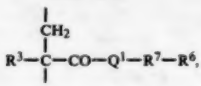
(a) 20 to 50 mol % of at least one structural element of formula I



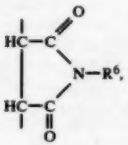
(I)

or its complexes with metals or metal compounds, with the exception of alkali metals or alkaline earth metals or alkali metal or alkaline earth metal compounds, wherein the —CH—$CH_2$—group is bonded in the 4- or 6-position, $R^1$ is hydrogen $C_1$-$C_6$-alkyl, $C_1$-$C_6$-alkoxy, phenyl or phenoxy and $R^2$ is hydrogen or methyl,

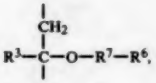
(b) 50 to 35 mol % of at least one structural element of any of formula IIIa to formula IIIi



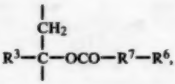
(IIIa)



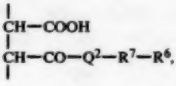
(IIIb)



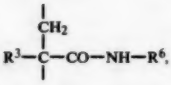
(IIIc)



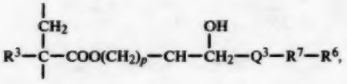
(IIId)



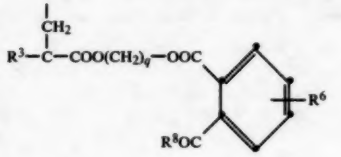
(IIIe)



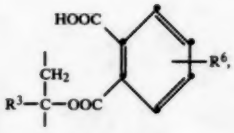
(IIIf)



(IIIg)



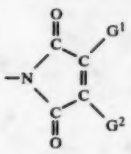
(IIIh)



(IIIi)

in which $Q^1$ is —O—, —S— or —NH—, $Q^2$ is —O—, —S—, —NH— or —$NR^3$ and $Q^3$ is —OCO—, —O—, —S—, —NH— or —$NR^3$, $R^3$ is a hydrogen atom or methyl, $R^7$ is straight-chain or branched alkylene having a total of 2 to 23 C atoms and 2 to 13 C atoms in the main

chain, cyclopentylene, cyclohexylene, phenylene or —($CH_2CH_2O$—)$_r$$CH_2CH_2$— in which r is an integer from 1 to 5, and $R^6$ is the radical of hte formula II



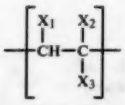
(II)

in which $G^1$ and $G^2$ independently of one another are alkyl having 1 to 4 C atoms, or $G^1$ and $G^2$ together form trimethylene or tetramethylene which is unsubstituted or substituted by methyl,

$R^8$ is —OH or —$O^-M^+$ in which $M^+$ is a cation,

p is 1 or 2, and q is an integer from 2 to 4, and

(c) 0 to 45 mol % of at least one structural element of formula IV



(IV)

in which $X_1$ is hydrogen, $X_2$ is hydrogen or methyl, and $X_3$ is —CN, —$CONH_2$, phenyl, pyridyl, pyrrolidyl, —COO—alkyl having 1 to 12 C atoms in the alkyl radical or —COO—alkylene—OH having 2 to 4 C atoms in the alkylene radical; or $X_2$ is hydrogen and $X_1$ and $X_3$ are each —COOH or together form an anhydride group.

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**4,713,423**

## METHOD OF CHLORINATING METHYL GROUPS OF METHYL VINYL AROMATIC POLYMERS

**Subramaniam Mohanraj, 6161 Shadow La., Apt. 262, Citrus Heights, Calif. 95621, and Warren T. Ford, 217 S. Ridge Rd., Stillwater, Okla. 74074**

**Filed Jul. 3, 1986, Ser. No. 881,689**
**Int. Cl.[4] C08F *8/20***
**U.S. Cl. 525—351** **25 Claims**

1. A method of chlorinating pendant aromatic methyl groups of a vinyl aromatic polymer comprising the step of reacting a vinyl aromatic polymer having at least one pendant aromatic methyl group and wherein said polymer is dissolved or swollen in an organic solvent with an aqueous hypochlorite solution in the presence of a phase transfer catalyst.

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**4,713,424**

## POLYMERIZATION OF OLEFINIC HYDROCARBONS AND COMPLEX-INITIATOR THEREFOR

**Ronald E. Brown, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

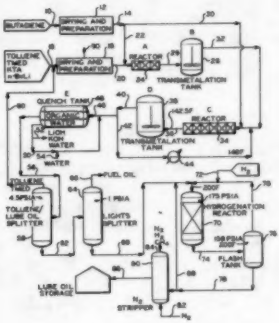
**Filed Nov. 5, 1984, Ser. No. 668,070**
**Int. Cl.[4] C07C *2/00***
**U.S. Cl. 585—424** **11 Claims**

1. A continuous, liquid phase method for the polymerization of a monomeric material, selected from the group consisting of (1) at least one conjugated diene and (2) a mixture of at least one conjugated diene and at least one vinyl-substituted aromatic hydrocarbon, to produce a polymer having a predetermined number of conjugated diene units, comprising:

(a) continuously contacting a first stream of said monomeric material with an organo-lithium compound, in a diluent containing at least about 30% by weight of an alkyl-substituted aromatic hydrocarbon, by continuously and separately feeding said first stream of monomeric material and said organo-lithium compound to the upstream end of a first, elongated reaction zone, in proportions and in a manner such that a predetermined number of moles of said conjugated diene, equal to said predetermined number of conjugated diene units, successively contacts and intimately mixes with each mole of said organo-lithium compound in the upstream end of said first, elongated reaction zone, and continuously and intimately mixing and moving said first stream of monomeric material and said organo-lithium compound through said first, elongated reaction zone, in a manner to maintain plug flow and reduce backmixing, under conditions and for a time sufficient to maintain a liquid phase and react said predetermined number of moles of said conjugated diene with each mole of said organo-lithium compound;

(b) mixing the effluent from step (a), an organo-alkali metal compound of an alkali metal selected from the group consisting of potassium, rubidium and cesium, and a tertiary amine in at least one stage of a first mixing zone under conditions and for a time sufficient to maintain a liquid phase and produce a complex-initiator comprising said alkyl-substituted aromatic hydrocarbon, the alkali metal ion of said alkali metal, selected from the group consisting of potassium, rubidium and cesium, and said tertiary amine;

(c) continuously contacting a second stream of said monomeric material with said complex-initiator, by continuously and separately feeding said second stream of monomeric material and said complex-initiator to the upstream end of a second, elongated reaction zone, in proportions and in a manner such that a predetermined number of moles of said conjugated diene, equal to said predetermined number of conjugated diene units, successively contacts and intimately mixes with each mole of said complex-initiator in the upstream end of said second, elongated reaction zone, and, continuously and intimately mixing and moving said second stream of monomeric material and said complex-initiator through said second, elongated reaction zone, in a manner to maintain plug flow and reduce backmixing, under conditions and for a time sufficient to maintain a liquid phase and react said predetermined number of moles of said conjugated diene with each mole of said complex-initiator;



(d) the volumetric ratio of said second stream of monomeric material to said first stream of monomeric material being between about 50/1 and about 400/1; and

(e) mixing the effluent from step (c), in at least one stage of a second mixing zone, under conditions and for a time sufficient to maintain a liquid phase and produce a polymer product comprising said predetermined number of conjugated diene units and said alkyl-substituted aromatic hydrocarbon.

**4,713,425**

## CHIP RESISTANT PRIMER COMPOSITION V"

**Panagiotis I. Kordomenos, Mt. Clemens; Andrew H. Dervan, Grosse Pointe Farms, and Dennis J. Grebur, Mt. Clemens, all of Mich., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Nov. 22, 1985, Ser. No. 800,942**

**Int. Cl.[4] C08G** *63/06, 63/20, 63/60;* **C08L** *63/02*

**U.S. Cl. 525—438** **20 Claims**

1. An organic solvent based, thermosetting coating composition comprising

(A) hydroxy functional epoxy ester resin having a number average molecular weight ($\overline{M}_n$) between about 1,000 and about 4,000 and being the reaction product of (1) a chain extended product of diepoxide with diphenol and dicarboxylic acid and (2) acid compenent in chain termination, said acid component comprising primary hydroxy functional acid and reacted in about a 1 to 1 equivalent ratio to chain extended product, wherein said diepoxide is reacted substantially simultaneously with said diphenol and dicarboxylic acid in amounts sufficient to give a weight per epoxide between about 500 and about 2,500;

(B) linear polycaprolactone diol having a molecular weight between about 1500 and about 5000, wherein said (A) and (B) are included in said composition in a weight ratio between about 4:1 and 1:4; and

(C) blocked polyisocyanate crosslinking agent comprising at least two isocyanate groups which have been blocked by reaction with an active hydrogen bearing blocking agent, which crosslinking agent de-blocks at the cure temperature of said composition, said crosslinking agent being included in said composition in an amount equal to between about 10 and 50 percent of the combined weight of said (A) and (B) in said composition.

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**4,713,426**

## BLENDS OF A BIPHENYL CONTAINING POLY(ARYL ETHER SULFONE) AND A POLY(ARYL ETHER KETONE)

**James E. Harris, Piscataway, and Lloyd M. Robeson, Whitehouse Station, both of N.J., assignors to Amoco Corporation, Chicago, Ill.**

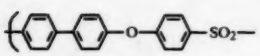
**Continuation of Ser. No. 655,580, Sep. 28, 1984, abandoned. This application Jun. 18, 1986, Ser. No. 876,294**

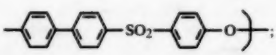
**Int. Cl.[4] C08L** *61/00, 81/06*

**U.S. Cl. 525—471** **11 Claims**

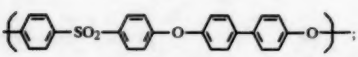
1. A blend comprising from about 5 to about 95 weight percent of a poly(aryl ether ketone) and from about 95 to about 5 weight percent of a biphenyl containing poly(aryl ether sulfone) selected from poly(aryl ether sulfones) having the following repeating units:

(a)

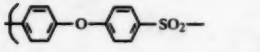


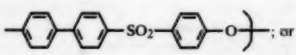


(b)

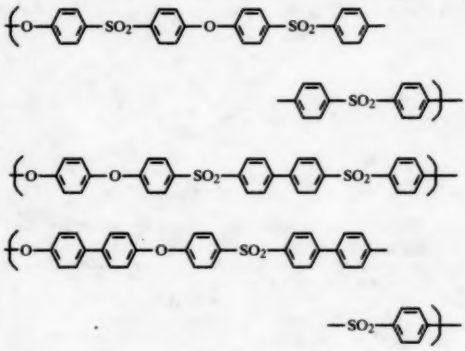


(c)





(d) a copolymer having the repeating units:



arranged randomly along the chain.

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**4,713,427**

## HIGH SOLIDS COATING COMPOSITIONS

**Mohinder S. Chattha, Livonia, and Ares N. Theodore, Farmington Hills, both of Mich., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**PCT No. PCT/US82/01090, § 371 Date Aug. 9, 1982, § 102(e) Date Aug. 9, 1982, PCT Pub. No. W084/00770, PCT Pub. Date Mar. 1, 1984**

**PCT Filed Aug. 9, 1982, Ser. No. 432,896**

**Int. Cl.[4] C08G** *12/32, 12/12;* **C08L** *61/24, 61/28*

**U.S. Cl. 525—510** **29 Claims**

1. A thermosetting coating composition comprising a mixture of components, said components of said mixture comprising:

(A) polyol having a number average molecular weight ($\overline{M}_n$) of between about 130 and about 5000;

(B) dicarboxylic acid anhydride comprising at least about 50 percent by weight of alkyl hexahydrophthalic anhydride, said dicarboxylic acid anhydride being included in said composition in an amount so as to provide between about 0.25 and about 1.5 anhydride groups for each hydroxyl group on said polyol;

(C) epoxy having one or more epoxide groups per molecule and having a number average molecular weight ($\overline{M}_n$) of between about 130–1500, said epoxy being included in said composition in an amount so as to provide at least about 1.0 epoxide group for each anhydride group; and

(D) amine-aldehyde crosslinking agent included in said composition in an amount sufficient to provide at least about 0.60 nitrogen crosslinking functional groups for each hydroxyl group initially present in said composition on said polyol (A), said coating composition being an essentially unreacted mixture of said components.

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**4,713,428**

## BRANCHED POLYESTERS

**Rolf Mülhaupt, Marly; Alfred Renner, Muntelier, and Horst Lauterbach, Therwil, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Sep. 12, 1986, Ser. No. 907,253**

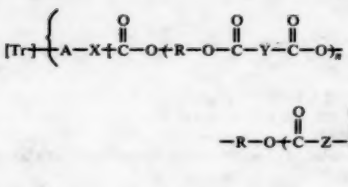
**Claims priority, application Switzerland, Sep. 16, 1985, 4011/85; Mar. 3, 1986, 846/86**

**Int. Cl.[4] C08F** *283/00;* **C08G** *59/14, 69/44*

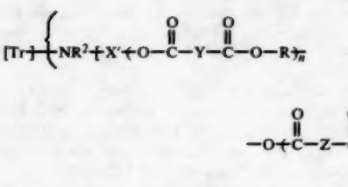
**U.S. Cl. 525—523** **20 Claims**

1. A compound of formula I, II, III or IV

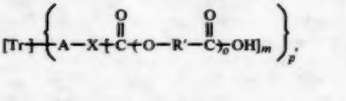
(I)



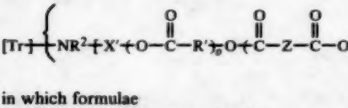
(II)



(III)



(IV)



in which formulae

tr is a radical of formula V or VI

(V) (VI)

A is —O— or —NR[1]—, R[1] is hydrogen, unsubstituted or substituted

$C_1$–$C_{20}$alkyl, $C_5$–$C_9$cycloalkyl, unsubstituted or substituted phenyl or

$C_7$–$C_9$aralkyl,

X is a di- or trifunctional radical of a hydroxycarboxylic or aminocarboxylic acid after removal of the functional groups, or

A and X together are the radical of a heterocyclic aminocarboxylic acid after removal of the carboxylic group, which radical is attached to the radical Tr through the nitrogen atom,

$R^2$, if m is 1, has one of the meanings of $R^1$, or $R^2$, if m is 2, is a free electron pair,

R is the radical of an aliphatic, cycloaliphatic, aromtic, araliphatic or heterocyclic diol after removal of the two hydroxyl groups, which radical may carry substituents containing no active hydrogen atoms,

Y is the radical of an aliphatic, cycloaliphatic, aromatic, araliphatic or heterocylic dicarboxylic acid after removal of the two carboxyl groups, which radical may carry substituents containing no active hydrogen atoms,

Z has one of the meanings of Y, but may additionally also carry carboxylic acid or sulfonic acid radicals as substituents,

R′ is the divalent radical of an aliphatic, cycloaliphatic, aromatic or araliphatic hydroxycarboxylic acid after removal of the carboxyl group and the hydroxyl group,

X′ is the di-or trivalent radical of an aliphatic, cycloaliphatic, aromatic or araliphatic aminoalcohol after removal of the amino and the hydroxyl group or groups,

n is an integer from 0 to 40, o is an integer from 1 to 40, m is 1 or 2, q is 0 or 1 and p, dependent on the radical Tr, is 3 or 4,

M is a radical —W—Q—W—, wherein

W is —O—, —NR[1]— or —NR[1]—X″—NR[1]—OC—,

X″ is the divalent radical of an aliphatic, cycloaliphatic, aromatic or araliphatic diamine after removal of the amino groups, and

Q is a divalent oligomer radical containing 1 to 60 monomers units, which radical is selected from the group consisting of 1,2-polybutadiene, 1,4-polybutadiene, acrylonitrile/-butadiene copolymers, polyethers or polydialkylsiloxanes, with the proviso that if Tr is a radical of formula V, the groups R and R′ may only be aliphatic or cycloaliphatic radicals, and that the compounds do not have a melting point above 200° C. and that at least one of n and q in formula II is greater than 0.

16. A composition which contains (a) a resin containing at least one 1,2-epoxide group in the molecule, and

(b) a compound of formula I, II, III or IV according to claim 1.

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**4,713,429**

## METHOD FOR PRODUCTION OF COPOLYMER OF VINYL CYANIDE COMPOUND AND AROMATIC VINYL COMPOUND

**Sadao Ikuma, Suzuka, Japan, assignor to Mitsubishi Monsanto Chemical Company, Tokyo, Japan**

**Filed Jun. 27, 1986, Ser. No. 879,393**

**Claims priority, application Japan, Jun. 28, 1985, 60-141969**

**Int. Cl.[4] C08F *2/18, 4/04, 212/10***

**U.S. Cl. 526—87** **2 Claims**

1. A method for producing by suspension polymerization a copolymer comprising a residue of a vinyl cyanide compound selected form the group consisting of acrylonitrile, methacrylonitrile and mixtures thereof, and a residue of an aromatic vinyl compound selected from the group consisting of styrene, α-methyl styrene, paramethylstyrene, t-butylstyrene, styrene halide and mixtures thereof, having a substantially uniform composition and a content of the vinyl cyanide residue in a range of from 50 to 85% by weight, said method comprising

(a) as a first step charging the total quantity of said vinyl cyanide compound and a partial quantity of said aromatic vinyl compound at a compositional ratio wherein the content of the polymerized residue of vinyl cyanide compound in the resulting copolymer attains an intended content within a range of from 50 to 85% by weight;

(b) as a second step initiating the copolymerization reaction by adding an azo-type polymerization initiator having a decomposition half-life at 95° C. of two hours or longer to the compounds charged in said first step after said compounds are elevated to a temperature corresponding to a decomposition half-life T of the polymerization initiator represented by the following equation (I) and calculated as t=0:

$$T = \frac{\log 2}{\log\left(\frac{t_0 - t}{t_0 - t - 1}\right)} \quad \text{(I)}$$

where: t denotes an elapsed time (in minute) after initiation of the copolymerization reaction as counted from the instant after the polymerization initiator is added to the reaction system and continuous feeding of the aromatic vinyl compound is commenced, as the starting point; $t_0$ represents an arbitrary time (in minute) which is longer by two minutes or more than the time for the continuous feeling of the aromatic vinyl compound; and T is the decomposition half-life (in minute) of the polymerization initiator; and

(c) as a third step carrying out the copolymerization reaction, while immediately and continuously feeding the remainder of the aromatic vinyl compound to the reaction system after commencement of the copolymerization reaction, and elevating the temperature of the reaction system along a temperature ($\theta$) corresponding to the decomposition half-life T of the polymerization initiator represented by the said equation (I), the quantity of aromatic vinyl compound fed in the third step being determined by the following formula (II):

$$Wsa = \frac{\eta(1 - Xan)}{1 - \eta(1 - Xan)} Wan - Wsi \quad (II)$$

where: Wsa denotes the total quantity (kg) of the aromatic vinyl compound to be continuously fed in the third step; Wan and Wsi respectively indicate the initial charging quantities (kg) of the vinyl cyanide compound and the aromatic vinyl compound used in the first step; $\eta$ designates the yield of the copolymer with the total quantity of the monomeric compound as a reference; and Xan is the content of the vinyl cyanide compound present in the resulting copolymer.

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4,713,430

## PREPARATION OF ETHENE POLYMERS BY MEANS OF A ZIEGLER CATALYST SYSTEM

**Juergen Kerth, Maxdorf, and Heinz Vogt, Ludwigshafen, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Dec. 22, 1986, Ser. No. 945,085**

**Claims priority, application Fed. Rep. of Germany, Dec. 24, 1985, 3546018**

**Int. Cl.[4] C08F *4/64***

**U.S. Cl. 526—159** **1 Claim**

1. A process for preparing finely divided homopolymers of ethene or copylymers of ethene with minor amounts of $C_3$–$C_8$-alpha-monoalkene by polymerizing the monomer(s) at 30°–150° C. and 1–200 bar by means of a Ziegler catalyst system composed of

(1) a titanium-containing catalyst component obtained as a precipitated product by bringing about a precipitation in a previously introduced organic liquid by introducing and bringing together with vigorous agitation

(1.1) a 0.1–10M solution of titanium tetrachloride in a liquid saturated aliphatic and/or aromatic hydrocarbon of 5–10 carbon atoms,

(1.2) a 0.1–10M solution of an organoaluminum compound of the empirical formula $R_nAlCl_{3-n}$, where n is a number within the range from 1.5 to 3 and R is alkyl of 1–12 carbon atoms, in a liquid saturated aliphatic and/or aromatic hydrocarbon of 5–10 carbon atoms and

(1.3) a $C_2$–$C_8$-alpha-monoalkene and

(2) an aluminum-containing catalyst component which is a trialkylaluminum which contains 1–12 carbon atoms per alkyl group,

with the proviso that the atomic ratio of titanium in catalyst component (1):aluminum in catalyst component (2) lies within the range 1:1 to 1:200, which comprises using as the titanium-containing catalyst component (1) one where the precipitation has been brought about at temperatures within the range from −30° to +30° C. in a previously introduced organic liquid which, at the precipitation temperature, has a viscosity within the range from 1.5 to 30 $mm^2/s$ and comprises (a) a liquid saturated aliphatic and/or aromatic hydrocarbon of 5–10 carbon atoms and (b), dissolved therein, relatively small amounts of a polymer of a $C_2$–$C_6$-alpha-monoalkene, with the provisos that (i) for every gram-mole of the total amount of titanium tetrachloride used a total of from 2 to 20 liters of the previously introduced organic liquid, a total of from 0.5 to 5 gram-moles of the organoaluminum compound and a total of from 5 to 500 gram moles of the alpha-monoalkene are used and (ii) for every mole unit of the total amount of titanium tetrachloride used from 0.002 to 0.15 mole units per minute are converted into precipitated product and from 0.02 to 1 mole unit per minute of the alpha-monoalkene are introduced into the precipitation system.

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4,713,431

## HIGH MOLECULAR WEIGHT DADMAC POLYMERS BY INVERSE EMULSION TECHNOLOGY

**Bhupati R. Bhattacharyya, Downers Grove, Ill., and Philip D. Dalsin, Carlsbad, Calif., assignors to Nalco Chemical Company, Naperville, Ill.**

**Continuation of Ser. No. 789,606, Oct. 21, 1985, abandoned. This application Nov. 12, 1986, Ser. No. 930,967**

**Int. Cl.[4] C08F *2/32***

**U.S. Cl. 526—207** **2 Claims**

1. A method of producing a high molecular weight water-in-oil emulsion of poly diallyl dimethyl ammonium chloride which comprises preparing a water-in-oil monomer emulsion of diallyl dimethyl ammonium chloride, said emulsion being further characterized as containing between 0.5–4% by weight of acrylamide based on the weight of diallyl dimethyl ammonium chloride monomer present in said emulsion, and then polymerizing said monomer emulsion in the presence of a low HLB emulsifier and a free radical initiator whereby a high molecular weight poly diallyl dimethyl ammonium chloride polymer is produced having an Intrinsic Viscosity greater than 2.

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4,713,432

## SOLID SOLUTION OF AMINE AND POLYMERIZED PHENOL

**Madan M. Bagga, Cambri[illegible] and Christopher H. Bull, Trumpington, both of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Division of Ser. No. 847,371, Apr. 2, 1986, Pat. No. 4,659,779. This application Jan. 12, 1987, Ser. No. 2,358**

**Claims priority, application United Kingdom, Apr. 2, 1985, 8508628**

**Int. Cl.[4] C08F *12/24*; C08G *59/68***

**U.S. Cl. 526—313** **7 Claims**

1. An accelerator for the cure of epoxide resins by nitrogen-containing latent curing agents which is a solid solution of a nitrogen base having a boiling point above 130° C. and an addition polymer of a phenol bearing an ethylenically unsaturated substituent.

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4,713,433

## LIQUID AND POLYMERIZABLE COMPOSITION SUITABLE FOR THE PRODUCTION OF ORGANIC GLASSES ENDOWED WITH HIGH ABRASION STRENGTH

**Fiorenzo Renzi, Gorgonzola; Franco Rivetti, Schio; Ugo Romano, Vimercate, and Claudio Gagliardi, San Donato Milanese, all of Italy, assignors to Enichem Sintesi S.p.A., Palermo, Italy**

**Filed Mar. 26, 1987, Ser. No. 31,437**

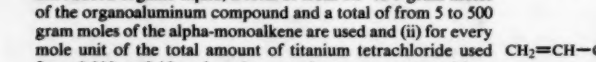
**Claims priority, application Italy, Apr. 17, 1986, 20124 A/86**

**Int. Cl.[4] C08F *220/26***

**U.S. Cl. 526—314** **8 Claims**

1. Liquid composition polymerisable to organic glasses endowed with a high abrasion strength, characterized in that it contains:

from 20 to 80% by weight of an oligomeric or essentially oligomeric product provided with two terminal allyl groups, definable by means of formula (I):



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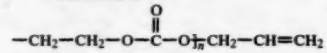
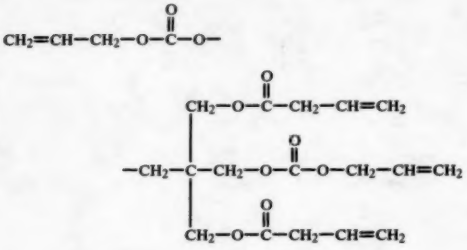
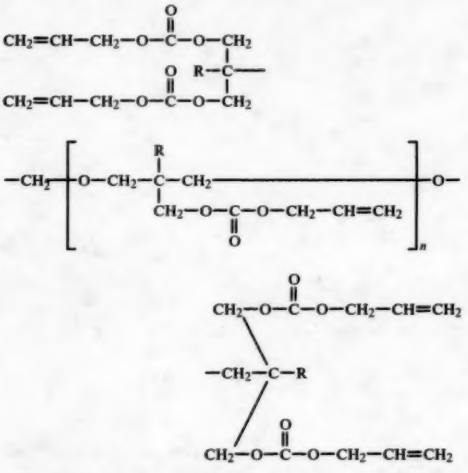


wherein: n assumes a value, or an average value, of from 2 to 5 (Component A);

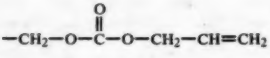
from 20 to 50% by weight of a monomeric, or essentially monomeric product provided with at least four terminal allyl groups, definable by means of formula (II):



or by means of formula (III):



wherein: R is the methyl or ethyl group; or it can be represented by the formula:



and n is either 0 or 1 (Component B);

from 0 to 35% by weight of one or more reactive diluents provided with groups of allyl, vinyl or methacryl type (Component C).

4,713,434

## CONTINUOUS EMULSION POLYMERIZATION PROCESS

Norbert Sutterlin, Ramstadt; Hans-Dieter Blitz, Jugenheim; Theodor Mager, Darmstadt; Karl-Heinz Jagsch, Gross-Gerau, and Dieter Tessmer, Russelsheim, all of Fed. Rep. of Germany, assignors to Röhm GmbH Chemische Fabrik, Darmstadt, Fed. Rep. of Germany

Filed Jun. 10, 1983, Ser. No. 503,171

Claims priority, application Fed. Rep. of Germany, Jun. 11, 1982, 3222002

Int. Cl.[4] C08F 2/00

U.S. Cl. 526—62 20 Claims

1. A process for the continuous preparation of aqueous synthetic resin dispersions which comprises:

(a) emulsifying one or more free-radically polymerizable monomers in an aqueous phase in the presence of an emulsifying agent, in an agitator vessel,

(b) initiating the free radical polymerization of said monomer of monomers in said aqueous phase, and

(c) passing said aqueous emulsion of the free-radically polymerizing monomer or monomers through at least one tubular reactor whose internal surface comprises a saturated polyolefin or a fluorinated saturated polyolefin.

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4,713,435

## PROCESS FOR PRODUCING AROMATIC POLYESTER

Hiroaki Sugimoto, Takatsuki; Kazuo Hayatsu, and Masahiro Fujiwara, both of Ibaraki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Oct. 27, 1986, Ser. No. 923,261

Claims priority, application Japan, Oct. 31, 1985, 60-245725

Int. Cl.[4] C08G 73/10

U.S. Cl. 528—179 11 Claims

1. In a process for producing an aromatic polyester by polycondensation of either

(1) (a) aromatic hydroxycarboxylic acids containing at least 50 mole % of p-hydroxybenzoic acid, and/or ester-forming derivatives of these acids,

(b) an aromatic dicarboxylic acid and/or an esterforming derivative of aromatic dicarboxylic acid, and

(c) an aromatic dihydroxy compound and/or an esterforming derivative of aromatic dihydroxy compound,

wherein the (a):(b) molar ratio and the (a):(c) molar ratio are each from 1:0 to 1:4, or

(2) (d) aromatic dicarboxylic acids containing at least 50 mole % of terephthalic acid, and/or esterforming derivatives of these acids and

(e) aromatic dihydroxy compounds containing at least 50 mole % of at least one of hydroquinone, substituted hydroquinone, 4,4'-dihydroxydiphenyl, and substituted 4,4'-dihydroxydiphenyl, and/or ester-forming derivatives of these dihydroxy compounds,

the improvement comprising carrying out the polycondensation by using a liquid compound which has a higher boiling point at normal pressure than the temperature of this reaction and is inert to the reaction, in an amount satisfying the equation

(theoretical quantity of aromatic polyester formed)/{(theoretical quantity of aromatic polyester formed) + (quantity of liquid compound)} = 0.70 to 0.98, by weight.

**4,713,436**

## GLYCOSIDE-CONTAINING POLYESTER PREPARATION PROCESS

**John D. Downs; Raymond L. Drury, Jr.; Kenneth B. Moser, and C. Deane Roth, all of Decatur, Ill., assignors to A. E. Staley Manufacturing Company, Decatur, Ill.**

**Filed Apr. 4, 1986, Ser. No. 848,434**

**Int. Cl.[4] C08G** *63/54, 63/48*

**U.S. Cl. 528—295.3** **16 Claims**

**16**. A single step process for preparing an alkyd resin product wherein a polyol component containing at least a minor proportion of a glycoside reactant, a lower alkyl ester of a polybasic acid and a lower alkyl ester of a fatty acid are all charged to a reaction vessel and are simultaneously reacted at an elevated temperature while removing at least a substantial portion of the lower alcohol which is liberated during the course of the reaction process.

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**4,713,437**

## SALT OF OXAALKYLENEDIAMINE WITH DICARBOXYLIC ACID, CONTAINING HYDRAZINE, PREPARATION, AND NYLON PREPARED THEREFROM

**Georg Pilz, Neustadt; Gert Buerger, Mannheim; Manfred Barl, Otterstadt, and Gerhard Thiel, Ludwingshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Jun. 18, 1986, Ser. No. 875,570**

**Claims priority, application Fed. Rep. of Germany, Jun. 21, 1985, 3522215**

**Int. Cl.[4] C08G** *69/28*

**U.S. Cl. 528—336** **7 Claims**

**1**. A composition comprising a salt of an oxaalkylenediamine of the formula I where $R^1$ and $R^2$

$$H_2N-(R^1-O)_n-R^2-NH_2 \qquad I$$

are identical or different and are each alkylene of 2 to 4 carbon atoms and n is an integer from 1 to 3, and an alkanedicarboxylic acid of 4 to 12 carbon atoms, terephthalic acid or isophthalic acid, and hydrazine.

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**4,713,438**

## AMIDE AND/OR IMIDE CONTAINING POLYMERS AND MONOMERS FOR THE PREPARATION THEREOF

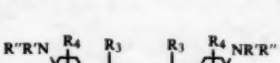
**James E. Harris, Piscataway; Abe Berger, Summit; Vilas M. Chopdekar; Markus Matzner, both of Edison, all of N.J., and James Spanswick, Wheaton, Ill., assignors to Amoco Corporation, Chicago, Ill.**

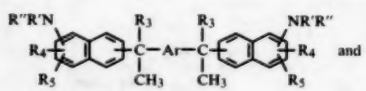
**Continuation-in-part of Ser. No. 760,592, Jul. 30, 1985, and Ser. No. 933,422, Nov. 21, 1986, which is a continuation of Ser. No. 757,933, Jul. 23, 1985. This application Dec. 24, 1986, Ser. No. 946,261**

**Int. Cl.[4] C08G** *69/42*

**U.S. Cl. 528—337** **8 Claims**

**1**. Polyamides derived from at least one of the following monomers:





and

or isomers thereof.

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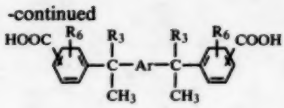
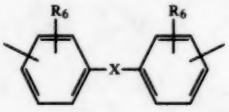
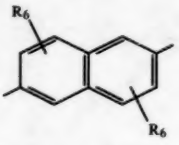


wherein R′ and R″ are independently hydrogen, straight chain or branched $C_1$ to $C_{10}$ alkyl and $C_6$ to $C_{20}$ aryl groups; at least one of R′ or R″ is hydrogen where amide bonds are formed; $R_3$ is a phenyl, a $CF_3$ or an alkyl group having from 1 to 10 carbon atoms; $R_4$ and $R_5$ are independently hydrogen, halogen, alkyl or alkoxy groups having from 1 to 4 carbon atoms, or aryl and aryloxy groups having from 6 to 20 carbon atoms; $R_6$ is an alkyl having more than one carbon atom, an aryl or aryloxy having from 6 to 20 carbon atoms; and Ar is

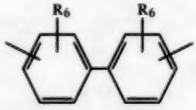


wherein X can be O, S, SO, $SO_2$,

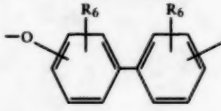
$CH_2$, an alkylene or alkylidene having from 2 to 8 carbon atoms, a cycloalkylene or cycloalkylidene having from 5 to 14 carbon atoms, or a phenylene group which may be substituted by an alkyl or alkoxy group having from 2 to 4 carbon atoms, or by a halogen; the group Ar may also be selected from



or an isomer thereof;



or an isomer thereof;



or an isomer thereof;

and wherein the subject monomers are used in an amount of at least 50 mole % based on the total monomers used.

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**4,713,439**

## POLY(CARBONATE-IMIDE) POLYMER

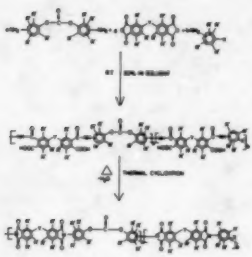
**Terry L. St. Clair, Poquoson, Va.; Shubha Maudgal, Bombay, India, and J. Richard Pratt, Poquoson, Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

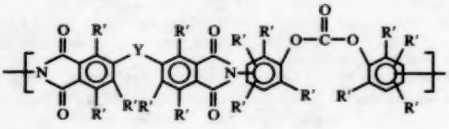
**Filed Feb. 27, 1986, Ser. No. 834,978**

**Int. Cl.[4] C08G** *69/26*

**U.S. Cl. 528—353** **13 Claims**

**1**. A poly(carbonate-imide) polymer comprising recurring units having the formula:

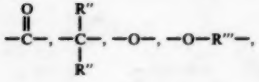


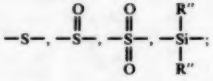


where

R′ comprises a monovalent radical, having one to twenty carbon atoms, selected from hydrogen, alkyl, aryl, alkoxy, halogenated hydrocarbon, and N,N-dialkylamino;

Y is nil or a divalent radical selected from





R″ comprises a monovalent radical, having one to twenty carbon atoms, selected from hydrogen, alkyl, aryl and halogenated hydrocarbon; and

R‴ comprises a divalent radical selected from alkylidene, arylidene, and halogenated hydrocarbon.

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**4,713,440**

**UREA/POLYAMINE/SECONDARY MONOAMINE/POLYALCOHOL CONDENSATE**

**Rolf Osterloh, Gruenstadt; Eberhard Schupp, Schwetzingen; Werner Loch, Eropolzheim, and Klaas Ahlers, Muenster, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Sep. 16, 1985, Ser. No. 776,378**

**Claims priority, application Fed. Rep. of Germany, Sep. 19, 1984, 3434318**

**The portion of the term of this patent subsequent to Feb. 4, 2003, has been disclaimed.**

**Int. Cl.[4] C08G 71/02**

**U.S. Cl. 528—367** **18 Claims**

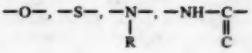
1. A process for the preparation of a urea condensate, wherein

(A) one or more primary amines selected from the group consisting of diamines and polyamines are reacted with

(B) urea,

(C) one or more secondary monoamines and

(D) one or more polyalcohols which contain two or more primary or secondary hydroxyl groups and in addition one or more of the groups ether oxygen



wherein R is alkyl ot ! to 12 carbon atoms, cycloalkyl, unsubstituted or substituted phenyl of 6 to ZO carbon atoms, hydroxyalkyl or 2 to 12 carbon atoms or a hydroxyalkyl radical obtained by an addition reaction of an epoxide compound with a secondary amine, or

(E) a mixture of (D) and one or more polyalcohols which differ from (D) and contain two or more primary or secondary hydroxyl groups,

at elevated temperatures and in the presence or absence of a catalyst, and the ammonia forsed is separated off.

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**4,713,441**

**POLYACETAL HYDROGELS FORMED FROM DIVINYL ETHERS AND POLYOLS**

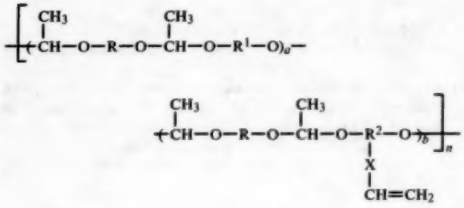
**Jorge Heller, Woodside, and Donald W. H. Penhale, Menlo Park, both of Calif., assignors to Sandoz Pharmaceuticals Corp., E. Hanover, N.J.**

**Filed Aug. 1, 1986, Ser. No. 892,520**

**Int. Cl.[4] C08G 67/02**

**U.S. Cl. 528—392** **9 Claims**

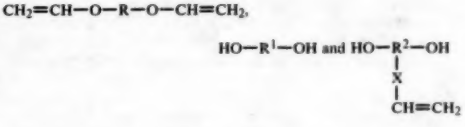
1. A water-soluble polyacetal having the formula



wherein; R, $R^1$, and $R^2$ are aliphatic, cycloaliphatic, or aromatic groups, and X represents groups such as $(CH_2)_n$, $(CH_2)_nO$, or

that connect the pendant unsaturation to the aliphatic, cycloaliphatic or aromatic $R^2$ groups, the ratio of a to b is 0.5 to 10, and n is 10–100.

9. A method of preparing a water-soluble polyacetal of claim 1, wherein monomers of the formula



are dissolved in a polar solvent in the presence of an acidic catalyst, and then evaporating the solvent to recover the polyacetal, wherein R, Rl, $R_2$ and X are as defined in claim 1.

## 4,713,442
## POLYAROMATIC CYANATE

**Edmund P. Woo, Midland, and Daniel J. Murray, Saginaw, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

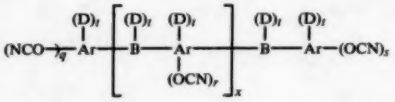
**Division of Ser. No. 522,234, Nov. 16, 1985, Pat. No. 4,631,700. This application Feb. 27, 1986, Ser. No. 833,931**

**Int. Cl.[4] C08G** *73/00*

**U.S. Cl. 528—422** **10 Claims**

1. A polytriazine which comprises 1,3,5-triaryloxytriazines which comprise the reaction product of

(a) between about 1 and 100 mole percent of an aromatic polycyanate which corresponds to the formula



wherein

Ar is an aromatic radical;

B is a $C_{7-20}$ polycyclic aliphatic radical;

D is independently in each occurrence any nonactive hydrogen-containing substituent;

q, r, and s are independently in each occurrence the integers 0, 1, 2, or 3;

with the proviso that the sum of q, r, and s is greater than or equal to 2;

t is independently in each occurrence an integer of between about 0 and 4 inclusive; and

x is a real number between about 0 and 5 inclusive;

(b) between about 0 and 99 mole percent of one or more cyanate containing compounds.

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## 4,713,443
## PROCESS FOR REMOVING ORGANIC COMPOUND HAVING HIGH BOILING POINT FROM A FLOATABLE POLYMER

**Toshimitsu Nakashima, Takasago; Wataru Okada, Kobe, and Toragoro Mitani, Takasago, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Dec. 16, 1985, Ser. No. 809,107**

**Claims priority, application Japan, Dec. 17, 1984, 59-265842; Jul. 4, 1985, 60-148040**

**Int. Cl.[4] C08F** *6/24*

**U.S. Cl. 528—499** **12 Claims**

1. A process for removing an organic compound having a boiling point of not less than 100 C. from a floatable polymer containing the organic compound, which comprises contacing an aqueous slurry of the plymer with a non-condensable carrier gas at a temperature in the range of 60 C. to 90 C. by strongly agitating with an agitator at an impeller Reynolds number of not less than $10^5$ to attain a level of the organic compound which does not adversely affect the properties of the floatable polymer.

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## 4,713,444
## FINISHING METHOD OF POLYMER SLURRY

**Kiyoshi Matsuyama, Ehime; Takatoshi Suzuki, Chiba, and Takeshi Chigusa, Ehime, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**Continuation of Ser. No. 664,171, Oct. 24, 1984, abandoned. This application May 30, 1986, Ser. No. 868,486**

**Claims priority, application Japan, Oct. 28, 1983, 58-203057**

**Int. Cl.[4] C08F** *6/16*

**U.S. Cl. 528—502** **3 Claims**

1. A method for recovering a polymer from a slurry of said polymer which comprises:

homopolymerizing ethylene or propylene or copolymerizing ethylene or propylene with another olefin in a hydrocarbon solvent having 3 to 5 carbon atoms, using a filter having a filtering zone which is composed of a filter element and an upper portion in a high pressure vessel, and

continuously supplying a polymer slurry formed as it is or after it is washed, to the filtering zone in the filter having a filtering surface on which a slight quantity of polymer particles are retained,

whereby most of said hydrocarbon solvent is recovered by passing through said filtering surface and the polymer particles which form a cake accumulate upwardly and overflow from the upper portion of the filter to be recovered as a wet cake.

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## 4,713,445
## RENIN INHIBITORS AND TREATMENTS USING THEM

**Michael Szelke, Ruislip; David M. Jones, Hayes, and Allan Hallett, Cheam, all of England, assignors to Aktiebolaget Hassle, Molndal, Sweden**

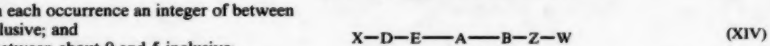
**Continuation-in-part of Ser. No. 469,540, Feb. 7, 1983, which is a continuation-in-part of Ser. No. 290,620, Aug. 5, 1981, Pat. No. 4,424,207. This application Aug. 17, 1984, Ser. No. 641,639**

**Claims priority, application United Kingdom, Aug. 19, 1983, 8322414; European Pat. Off., Feb. 6, 1984, 84300733.7**

**Int. Cl.[4] C07K** *7/06, 5/10*

**U.S. Cl. 530—330** **35 Claims**

1. Compounds of the general formula



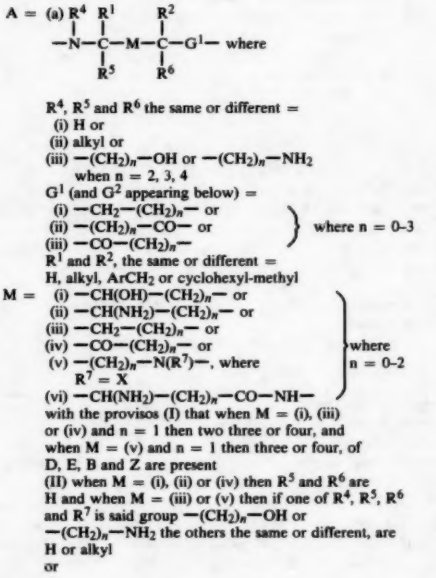
(XIV)

where

X=H or an N-protecting group or groups

D=absent or is Phe, αNal, βNal, Tyr, His, Trp or cyclohexyl alanyl as such or reduced at carbonyl

E=absent or is His Ala, Phe, Tyr, Trp, 2-aminobutyrl or α, δ-diaminovaleryl as such or Nα-alkylated or reduced at carbonyl



A = (a) $-N(R^4)-C(R^5)-M-C(R^6)-G^1-$ where

$R^4$, $R^5$ and $R^6$ the same or different =
(i) H or
(ii) alkyl or
(iii) $-(CH_2)_n-OH$ or $-(CH_2)_n-NH_2$ when n = 2, 3, 4

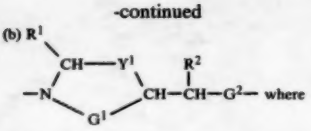
$G^1$ (and $G^2$ appearing below) =
(i) $-CH_2-(CH_2)_n-$ or
(ii) $-(CH_2)_n-CO-$ or
(iii) $-CO-(CH_2)_n-$
} where n = 0–3

$R^1$ and $R^2$, the same or different =
H, alkyl, $ArCH_2$ or cyclohexyl-methyl

M = (i) $-CH(OH)-(CH_2)_n-$ or
(ii) $-CH(NH_2)-(CH_2)_n-$ or
(iii) $-CH_2-(CH_2)_n-$ or
(iv) $-CO-(CH_2)_n-$ or
(v) $-(CH_2)_n-N(R^7)-$, where $R^7$ = X
(vi) $-CH(NH_2)-(CH_2)_n-CO-NH-$
} where n = 0–2

with the provisos (I) that when M = (i), (iii) or (iv) and n = 1 then two three or four, and when M = (v) and n = 1 then three or four, of D, E, B and Z are present
(II) when M = (i), (ii) or (iv) then $R^5$ and $R^6$ are H and when M = (iii) or (v) then if one of $R^4$, $R^5$, $R^6$ and $R^7$ is said group $-(CH_2)_n-OH$ or $-(CH_2)_n-NH_2$ the others the same or different, are H or alkyl
or

-continued

A = (b)  where

$R^1$, $R^2$ and $G^1$, $G^2$, the same or different, are as defined above and

Y = (i) —CO— or
(ii) —$CH_2$— or
(iii) —CH(OH)— or
(iv) —$CH(NH_2)$— or
(v) —$CH_2$—$NR^3$— ($R^3$ as above)

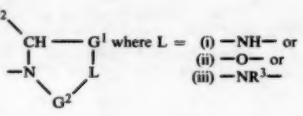
B = absent or is Val, Leu, Ile Phe either as such or Nα—alkylated and/or reduced at carbonyl

Z = absent or is His, Phe, Tyr, or cyclohexyl alanyl and is either as such or Nα—alkylated and/or reduced at carbonyl

W = (a) —OH,
(b) —$OR^3$
(c) —$NH_2$, —$NHR^3$, —$N(R^3)_2$ } $R^3$ as above

(d) —N◯ where N is part of a heterocyclic ring

optionally substituted with $R_3$ or $R^3$ $CH_2$—groups at one or more positions
or

Z–W =  where L = (i) —NH— or (ii) —O— or (iii) —$NR^3$—

and $R^3$ and $G^1$ and $G^2$, the same or different, are as defined above and

Q = (i) H or
(ii) $C_{1-4}$ alkyl or
(iii) aryl or
(iv) imidazol-4-yl- or indol-3-yl

all compounds being in free form or protected at one or more remaining peptide, carbonyl, amino or other reactive groups including peptide nitrogen or in salt form at amino imidazole or carboxyl groups in particular as physiologically acceptable acid addition salts at basic centres.

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**4,713,446**

## VISCOELASTIC COLLAGEN SOLUTION FOR OPHTHALMIC USE AND METHOD OF PREPARATION

**Dale P. DeVore, Chelmsford, Mass.; Robert A. Scherrer, White Bear Lake, and Matthew T. Scholz, Woodbury, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Continuation-in-part of Ser. No. 773,310, Sep. 6, 1985, abandoned. This application Aug. 6, 1986, Ser. No. 890,847**
**Int. Cl.[4] A61K *31/78*; A61B *17/00***
**U.S. Cl. 530—356** **31 Claims**

1. A chemically-modified collagen compound which comprises at least two native collagen molecules which are coupled at at least one lysine epsilon amino group present on each said collagen molecule by a coupling group, said coupling group comprising at least two moieties selected from the group consisting of carbonyl and sulfonyl groups.

15. A method of making a chemically-modified collagen compound comprising the steps of

(a) adding to an aqueous solution of at least about 0.05 percent by weight native collagen, a coupling agent in an amount equal to about 1 to 600 moles of coupling agent per mole of native collagen, said coupling agent selected from the group consisting of di- and tri-carboxylic acid halides, di- and tri-sulfonyl halides, di- and tri-anhydrides, di- and tri-reactive active esters, and compounds having at least two moieties selected from the group consisting of carboxylic acid halide, sulfonyl halide, anhydride and active ester; and

(b) reacting said native collagen and said coupling agent at a pH of above about 8 and at a temperature of between about 0° and 35° C., for a time period sufficient to either react or hydrolyze substantially all of said coupling agent.

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**4,713,447**

## PROCESS FOR PREPARING ALKYL GLYCOSIDES

**James C. Letton, Forest Park, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation-in-part of Ser. No. 509,895, Jun. 30, 1983, abandoned. This application Sep. 28, 1983, Ser. No. 536,472**
**Int. Cl.[4] C07G *3/00***
**U.S. Cl. 536—18.6** **13 Claims**

1. An improved process for preparing alkyl glycosides having from about 1 to about 30 carbon atoms in the alkyl chain, comprising the steps of:

(a) reacting a $C_1$ to $C_{30}$ monohydric alcohol with a source of reducing monosaccharide moiety, selected from the group consisting of reducing monosaccharides, corn syrup, molasses and the glycosides of $C_1$ to $C_4$ alcohols, in the presence of an acid catalyst; and

(b) neutralizing the catalyst with a base to a pH of from about 6.6 to about 7;

the improvement comprising neutralizing the catalyst with an organic base of the formula $(RO)_nM$, wherein R is a substituted or unsubstituted alkyl or acyl of from 1 to about 30 carbon atoms, M is selected from the group consisting of alkali metal, alkaline earth metal and aluminum and n is 1 when M is alkali metal, 2 when M is alkaline earth metal, and 3 when M is aluminum.

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**4,713,448**

## CHEMICALLY MODIFIED HYALURONIC ACID PREPARATION AND METHOD OF RECOVERY THEREOF FROM ANIMAL TISSUES

**Endre A. Balazs, Ft. Lee; Adolf Leshchiner; Adelya Leshchiner, both of Fairview, all of N.J., and Philip Band, Brooklyn, N.Y., assignors to Biomatrix, Inc., Ridgefield, N.J.**

**Filed Mar. 12, 1985, Ser. No. 710,929**
**Int. Cl.[4] C08B *37/08*; C08F *8/00*; C12P *19/04*; C12R *1/46***
**U.S. Cl. 536—55.1** **27 Claims**

1. A method of obtaining a chemically modified hyaluronic acid preparation comprising:

(a) treating animal tissue containing hyaluronic acid with an aqueous treating mixture including, an aldehyde to effect chemical modification of the hyaluronic acid contained in the tissue, in situ,

(b) removing excess treating mixture from the reaction mixture,

(c) extracting the chemically modified hyaluronic acid from the treated animal tissue with water,

(d) separating the extract containing the chemically modified hyaluronic acid from the treated animal tissue, and

(e) recovering the chemically modified hyaluronic acid from the extract.

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**4,713,449**

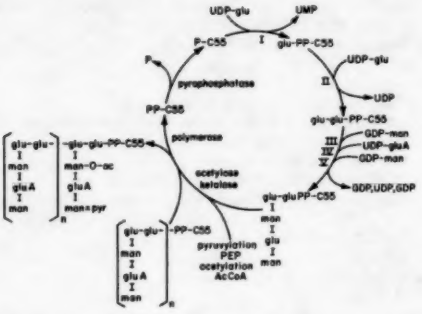
## POLYSACCHARIDE POLYMER MADE BY XANTHOMONAS

**Rebecca W. Vanderslice, and Shannon, Patrick, both of Boulder, Colo., assignors to Getty Scientific Development Company, Houston, Tex.**

**Filed Aug. 6, 1985, Ser. No. 762,878**
**Int. Cl.[4] C08B *37/00, 37/18***
**U.S. Cl. 536—123** **5 Claims**

1. Water-soluble, polysaccharide polymer consisting essentially of glucose and mannose moieties, having D-glucose:D-

mannose ratio of about 2:1, wherein the D-glucose moieties are linked in a beta-[1,4] configuration, and the D-mannose moi-




eties are linked in an alpha-[1,3] configuration, generally to alternate glucose moieties.

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**4,713,450**

## 2-THIACEPHEMS AND (5R) PENEMS DERIVATIVES

**Marco Alpegiani; Angelo Bedeschi; Maurizio Foglio; Giovanni Franceschi, and Ettore Perrone, all of Milan, Italy, assignors to Farmitalia Carlo Erba S.p.A., Milan, Italy**

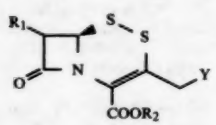
**Division of Ser. No. 558,629, Dec. 6, 1983, Pat. No. 4,585,874. This application Jan. 24, 1986, Ser. No. 821,968**

**Claims priority, application United Kingdom, Dec. 8, 1982, 8235058; Aug. 27, 1983, 8323129**

**Int. Cl.[4] C07D** *513/02*

**U.S. Cl. 540—214** **32 Claims**

1. A process for preparing a 2-thiacephem derivative of formula II:



II

wherein $R_1$ represents a hydrogen atom; an alkyl group having from 1 to 12 carbon atoms optionally substituted with mercapto, protected mercapto, amino, hydroxy, or a cyano group; or a monocycloalkyl group having from 5 to 6 carbon atoms optionally substituted with either an alkyl group having from 1 to 6 carbon atoms or with mercapto, protected mercapto, amino, or hydroxy group;

$R_2$ represents a straight or branched alkyl group having from 1 to 6 carbon atoms; an alkenyl group having from 2 to 4 carbon atoms; phenyl, benzyl, 2- and 4-methoxybenzyl, 2- and 4-nitrobenzyl, 2,6- and 2,4-dimethoxybenzyl, 4-methoxycarbonylbenzyl, benzhydryl, o-nitro-benzhydryl, acetonyl, trimethylsilyl, diphenyl-t-butyl-silyl, acetoxymethyl, pivaloyloxymethyl, or phthalidyl group; and Y represents a hydrogen atom or

(a) hydroxy or protected hydroxy group;

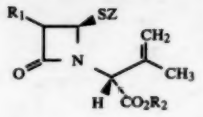
(b) a formyloxy group or an acyloxy group having from 2 to 6 carbon atoms,

(c) carbamoyloxy group;

(d) an alkoxy group having from 1 to 4 carbon atoms or an alkylthio group having from 1 to 4 carbon atoms,

(e) 1-pyridinium or carbamoyl pyridinium or

(f) methyltetrazolylthio, characterized in that a compound of formula IV



IV

wherein $R_1$ and $R_2$ have the above meanings and Z represents

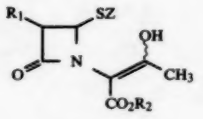
(i) $C_1$–$C_4$ alkylthio, phenylthio, p-tolylthio, 2-benzothiazolylthio or 1-methyl-tetrazol-5-yl-thio;

(ii) $C_1$–$C_4$ acylthio;

(iii) succinimido or phthalimido or

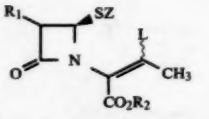
(iv) $C_1$–$C_4$ alkylsulphinyl, phenylsulphinyl or p-tolylsulphinyl;

is first ozonolyzed in an inert organic solvent by cooling up to −70° C. to give a compound of the formula



VI

wherein $R_1$, $R_2$ and Z have the above meaning, treating with alkylsulphonyl halide, in an inert organic solvent, in the presence of an organic base and cooling up to −40° C. to obtain a compound of formula VIII:



VIII

wherein $R_1$, $R_2$ and Z have the above meaning and L represents an alkylsulphonyloxy which is reacted with a sulphide $M_2S$ or hydrosulphide MHS, wherein M is sodium, potassium, ammonium, triethylammonium, pyridinium or tetrabutylammonium, in an organic solvent at from the room temperature to −50° C., to obtain the desired compound.

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**4,713,451**

## CRYSTALLINE DIMETHYLIMINOTHIENAMYCIN

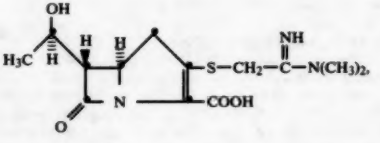
**William J. Leanza, Berkeley Heights, and Kenneth J. Wildonger, Bridgewater, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed Apr. 9, 1984, Ser. No. 597,944**

**Int. Cl.[4] C07D** *487/04;* **A61K** *31/40*

**U.S. Cl. 540—350** **1 Claim**

1. Crystalline 5R,6S-6-(1-R-hydroxyethyl) 2-(N,N-dimethylamidinomethylthio)-carbapen 2-em-3-carboxylic acid, having the formula;



and having the following X-ray powder diffraction parameters:

| d-Spacing | Relative Intensity |
|---|---|
| 8.15 | 8.29 |
| 7.62 | 7.02 |
| 6.51 | 17.73 |
| 5.27 | 16.40 |
| 4.85 | 100.00 |
| 4.76 | 35.05 |
| 4.45 | 32.98 |
| 4.14 | 24.01 |
| 3.90 | 30.40 |
| 3.85 | 18.71 |
| 3.79 | 9.90 |
| 3.66 | 8.46 |
| 3.25 | 30.80 |
| 3.16 | 15.20 |
| 3.07 | 18.02 |
| 3.02 | 26.72 |
| 2.90 | 12.95 |
| 2.71 | 7.83 |
| 2.62 | 11.34 |

## 4,713,452
## PROCESS FOR PREPARATION OF AZETIDINONE DERIVATIVES

**Sigeru Torii; Hideo Tanaka, both of Okayama; Michio Sasaoka, Tokushima; Seiryu Uto, Tokushima, and Syozo Hayase, Tokushima, all of Japan, assignors to Otsuka Kagaku Kabushiki Kaisha, Osaka, Japan**

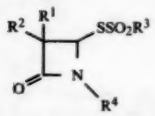
**Filed Dec. 12, 1984, Ser. No. 680,723**

**Claims priority, application Japan, Dec. 12, 1983, 58-234723**

**Int. Cl.[4] C07D 205/08; C07B 45/00; C07F 9/65, 7/10**

**U.S. Cl. 540—358** **7 Claims**

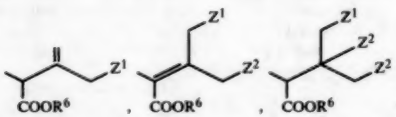
1. A process for preparing an azetidinone derivative represented by the formula



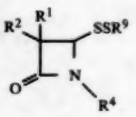
(I)

wherein $R^1$ is hydrogen, halogen or lower alkoxy, $R^2$ is hydrogen, a halgen, lower alkoxy, amino or a group

(in which $R^5$ is substituted or unsubstituted phenyl, substituted or unsubstituted phenylmethyl, substituted or unsubstited phenoxymethyl, or substituted or unsubstituted benzoyl), or $R^1$ and $R^2$, when taken together with the carbon atom in the azetidinone ring, are carbonyl, $R^3$ is substituted or unsubstituted phenyl, and $R^4$ is hydrogen or one of the following groups



(in which $R^6$ is hydrogen or a carboxy protecting group, and $Z^1$ and $Z^2$ are the same or different and reprsent hydrogen, a halogen, $C_1$–$C_4$ alkylthio, phenylthio optionally substituted with 1 to 5 nitro groups or halogen atoms on the phenyl ring, 2-pyridylthio, 2-benzothiadiazolylthio, 1,3,4-thiadiazol-5-ylthio, 1,2,3,4-tetrazol-5-ylthio, O-ethyldithiocarbonate, N,N-diethyldithiocarbamate, phenyl-sulfonyl, p-methylphenylsulfonyl, hydroxy, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ acyloxy, benzoyloxy, nitrosoxy, diphenylphosphonyloxy, methanesulfonate, diphenylmethyloxy, di($C_1$–$C_4$ alkyl)amino or piperidin-1-yl), the process comprising reacting a dithioazetidinone derivative represented by the formula



(VI)

wherein $R^1$, $R^2$ and $R^4$ are as defined above and $R^9$ is a substituted or unsubstituted, nitrogen-containing aromatic heterocyclic residue with a compound represented by the formula



(VII)

wherein $R^3$ is as defined above.

## 4,713,453
## OXABICYCLOHEPTANE DERIVATIVES

**Toshio Tatsuoka, Hyogo; Kenji Suzuki, Osaka; Kayoko Imao, Nara; Fumio Satoh, Kyoto; Seiji Miyano, and Kunihiro Sumoto, both of Fukuoka, all of Japan, assignors to Suntori Limited, Osaka, Japan**

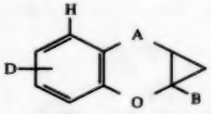
**Filed Feb. 27, 1987, Ser. No. 19,973**

**Claims priority, application Japan, Feb. 27, 1986, 61-42732**

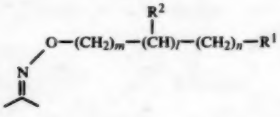
**Int. Cl.[4] C07D 417/00, 413/00, 405/00, 401/00**

**U.S. Cl. 544—60** **5 Claims**

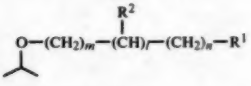
1. An oxabicycloheptane derivative having the following general formula or a pharmaceutically acceptable salt thereof:



where D is a hydrogen atom, a halogen atom, a hydroxyl group, an alkoxy group, an arylalkoxy group, an acyloxy group, a dialkylcarbamoyloxy group or an amidoalkyloxy group; B is a substituted or unsubstituted phenyl, thienyl or furyl group; A is the group

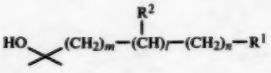


(where l is 0 or 1; m and n are each 1 or more, provided that m+n is an integer of 2–8; $R^1$ is an alkylamino group, a dialkylamino group, an arylalkylamino group, a morpholino group, a thiomorpholino group, a 1-pyrrolidinyl group, a piperidino group, an N-alkylpiperazinyl group, an N-hydroxyalkylpiperazinyl or a pyrrolizidinyl group; and $R^2$ is a lower alkyl group or a hydroxyl group), or the group



(where l, m, n, $R^1$ and $R^2$ are each the same as defined above), or the group

(where $R^3$ and $R^4$ which may be the same or different each represents a hydrogen atom, a lower alkyl group, an alkoxycarbonyl group or an acyl group), or the group



(where m, l, n, $R^1$ and $R^2$ are each the same as defined above).

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**4,713,454**

## PREPARATION PROCESS OF (6R)-TETRAHYDRO-L-BIOPTERIN

**Hideaki Sakai, Yokohama, and Tadashi Kanai, Chiba, both of Japan, assignors to Shiratori Pharmaceutical Co., Ltd., Narashino and Suntory Limited, Osaka, both of, Japan**

**Filed Jan. 23, 1986, Ser. No. 824,288**

**Claims priority, application Japan, Jan. 28, 1985, 60-12477; Jan. 28, 1985, 60-12478**

**Int. Cl.[4] C07D** *475/04*

**U.S. Cl. 544—258** **11 Claims**

1. A process for the preparation of (6R)-tetrahydro-L-biopterin, which comprises:

hydrogenating L-erythro-biopterin or an acyl derivative thereof in the presence of an amine other than said biopterin starting material which controls the pH of the reaction medium to within the range of 10–13 and a platinum-based hydrogenation catalyst, and, in the event at least one acyl group remains in the hydrogenated biopterin product obtained,

removing the acyl group by hydrolysis.

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**4,713,455**

## CYCLIC DERIVATIVES OF ALKYL DIHYDROXYALKYLXANTHENES

**Harald Furrer, Kelkheim; Hiristo Anagnostopulos, Taunusstein, and Ulrich Gebert, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

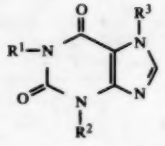
**Division of Ser. No. 420,932, Sep. 17, 1982, Pat. No. 4,616,020. This application Apr. 4, 1986, Ser. No. 848,139**

**Claims priority, application Fed. Rep. of Germany, Sep. 26, 1981, 3138397**

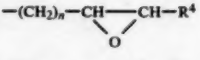
**Int. Cl.[4] C07D** *405/06*

**U.S. Cl. 544—267** **11 Claims**

1. A compound of the formula

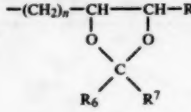


in which one of the radicals $R^1$, $R^2$ and $R^3$ represents a group of formula IV



(IV)

or formula IX



(IX)

$R^4$ denoting hydrogen or methyl; $R^6$ and $R^7$, independently of one another, being hydrogen, lower alkyl, phenylalkyl having up to 2 C atoms in the alkyl moiety or phenyl; n, when $R^4$ is hydrogen, denoting an integer from 2 to 6 and, when $R^4$ is methyl, denoting 1 to 5, the rest of the radicals $R^1$, $R^2$ and $R^3$, independently of one another, denoting hydrogen or alkyl having 1 to 12 C atoms in the positions $R^1$ and $R^3$ and having 1 to 4 C atoms in the position $R^2$, the total number of carbon atoms in these two radicals being a maximum of 14.

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**4,713,456**

## PROCESS FOR THE PREPARATION OF 5-ACYLPYRIMIDINES

**Hans-Ludwig Elbe, and Graham Holmwood, both of Wuppertal, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

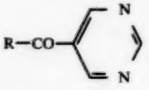
**Filed Aug. 26, 1985, Ser. No. 769,639**

**Claims priority, application Fed. Rep. of Germany, Aug. 29, 1984, 3431689**

**Int. Cl.[4] C07D** *239/26, 401/06, 403/06, 405/06, 407/06, 409/06, 411/06, 413/06*

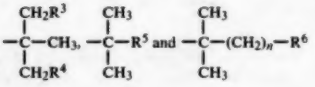
**U.S. Cl. 544—335** **3 Claims**

1. A process for the preparation of a 5-acylpyrimidine of the formula



in which

R represents straight-chain or branched alkyl with 1 to 12 carbon atoms, straight-chain or branched alkenyl with 3 to 6 carbon atoms, straight-chain or branched alkinyl with 3 to 6 carbon atoms or cycloalkyl and cycloalkylalkyl with in each case 3 to 7 carbon atoms in the alkyl part and in each case optionally mon-, di- or tri-substituted by identical or different alkyl substituents with 1 to 4 carbon atoms; or represents phenyl which is optionally mono-, di- or tri-substituted by identical or different substituents selected from the group consisting of halogen, hydroxyl, alkyl, alkoxy and alkylthio with in each case 1 to 4 carbon atoms; halogenoalkyl, halognoalkoxy and halogenoalkylthio with in each case 1 to 4 carbon atoms and 1 to 5 identical or different halogen atoms; nitro, cyano and alkoxycarbonyl with 1 to 4 carbon atoms in the alkoxy part, and phenyl and phenoxy, in each case optionally substituted by halogen; or furthermore represents 5- to 6-membered heteroaryl which has 1 to 3 oxygen, nitrogen and/or sulphur atoms, and is optionally mono-, di or tri-substituted by identical or different substitutents, possible substituents being the abovementioned substituents on phenyl, or represents the groupings



wherein

$R^3$ represents fluorine, chlorine or bromine;

$R^4$ represents hydrogen, fluorine, chlorine or bromine;

$R^5$ represents straight-chain or branched alkenyl with 2 to 4 carbon atoms, straight-chain or branched alkinyl with 3 to 5 carbon atoms, or the CHO group, alkoximinomethyl with 1 to 4 carbon atoms in each alkoxy part, dialkoxymethyl with 1 to 4 carbon atoms in each alkoxy part, dioxolanyl and dioxanyl;

$R^6$ represents cyano, or represents phenyl which is optionally mono- di or tri-substituted by identical or different substituents, possible substituents being the substituents on phenyl which have already been mentioned above, or represents the groupings $-XR^7$ and $-CONR^8R^9$,

wherein

$R^7$ represents straight-chain or branched alkyl with 1 to 6 carbon atoms or halogenoalkyl with 1 to 4 carbon atoms and 1 to 5 identical or different halogen atoms or represents phenyl or phenylalkyl, with 1 or 2 carbon atoms in the alkyl part, each of which is optionally mono-, di- or tri-substituted by identical or different substituents, possible substituents in each case being the substituents on phenyl which have already been mentioned above;

$R^8$ represents hydrogen or straight-chain or branched alkyl with 1 to 4 carbon atoms, or represents phenyl which is optionally mono- di- or tri-substituted by identical or different substituents, possible substituents being the substituents on phenyl which have already been mentioned above;

$R^9$ represents hydrogen or straight-chain or branched alkyl with 1 to 4 carbon atoms;

x represents oxygen or sulphur and

n represents the number 0, 1 or 2,

comprising reacting a methyl ketone of the formula

$$R-CO-CH_3$$

(a) in a first stage with a formylating reagent selected from the group consisting of a formic acid alkyl ester with 1 to 4 carbon atoms in the alkyl group, and phenyl formate, in the presence of a base at a temperature between −25° C. and +60° C., thereby forming an enol-ketone of the formula

$$R-CO-CH=CH-OR^{10}$$

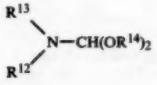
in which

$R^{10}$ represents hydrogen or an alkali metal, in a second stage reacting the enol-lactone with formamidine or a salt thereof with an organic or inorganic acid, at a temperature between −25° C. and +50° C. thereby to form a formamidine derivative of the formula

$$R-CO-CH_2-CH=N-CH=NH;$$

in a third state reacting the formamidine derivative with an amino-formylating agent selected from the group consisting of

(α) a formamidine acetal of the formula



in which

$R^{12}$ and $R^{13}$ independently of one another represent metyl, ethyl, n-propyl, isopropyl or n-butyl, or

$R^{12}$ and $R^{13}$, together With the nitrogen atom to which they are bonded, represent pyrrolidinyl, piperidinyl, morpholinyl or N-methyl-piperazinyl, and

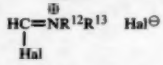
$R^{14}$ represents methyl, ethyl or n-propyl,

(β) an aminal ester of the formula

$$R^{14}-O-CH(NR^{12}R^{13})_2$$

and

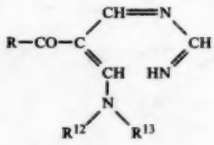
(γ) a formimimum halide of the formula



in which

Hal represents halogen,

at a temperature between −25° C. and +50° C., thereby to form a compound of the formula



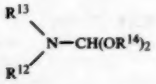
and, in a fourth stage cyclizing such compound by heating to a temperature between 0° C. and 100° C., or

(b) in a first stage with a formylating reagent selected from the group consisting of a formic acid alkyl ester with 1 to 4 carbon atoms in the alkyl group, and phenyl formate, in the presence of a base at a temperature between −25° C. and +60° C., to form an enol-ketone of the formula

$$R-CO-CH=CH-OH,$$

in a second stage reacting the enol-lactone with an amino-formylating agent selected from the group consisting of

(α) a formamidine acetal of the formula

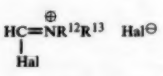


(β) an amimal ester of the formula

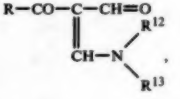
$$R^{14}-O-CH(NR^{12}R^{13})_2$$

and

(γ) a formiminum halide of the formula



at a temperature between −25° C. and +50° C., to form a compound of the formula



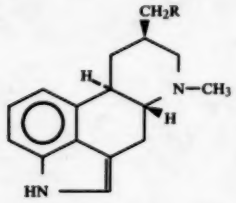
reacting such compound with formamidine at a temperature between −20° C. and +30° C., and then cyclizing the product formed by heating to a temperature between 0° C. and 100° C.

## 4,713,457
## ERGOLINE DERIVATIVES AND ACID ADDITION SALTS THEREOF

Sachio Ohno; Yuko Ebihara; Kiyoshi Mizukoshi, all of Aichi; Kenji Ichihara, Gifu; Takao Ban, and Mitsuaki Nagasaka, both of Aichi, all of Japan, assignors to Maruko Seiyaku Co., Ltd., Nagoya, Japan

Filed Feb. 21, 1986, Ser. No. 831,676
Claims priority, application Japan, Feb. 21, 1985, 60-33430; Dec. 28, 1985, 60-299203
Int. Cl.[4] A61K *31/48*; C07D *457/00*
U.S. Cl. 546—67 3 Claims

1. An ergoline compound represented by the formula (I)



(I)

wherein R represents a 5-membered heterocyclic group which contains at least one nitrogen atom as a hereto atom and which is a monovalent group with the nitrogen atom of that group carrying the monovalency, selected from the group consisting of an imidazol-1-yl group, a 2-oxooxazolidin-3-yl group, a 1,2,4-triazol-1-yl group, a tetrazolyl group, a succinimido group, a 2-methylimidazol-1-yl group, a 2-ethylimidazol-1-yl group, a 2-isopropylimidazol-1-yl group, a 2-propylimidazol-1-yl group, a 2-phenylimidazol-1-yl group, a 2-ethyl-4-methylimidazol-1-yl group, a 5-ethoxycarbonyl-4-methylimidazol-1-yl group and a 4-ethoxycarbonyl-5-methylimidazol-1-yl group, and a pharmaceutically acceptable acid addition salt thereof.

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## 4,713,458
## PREPARATION OF ETHENYLIDENES

Kevin A. Frazier, Midland, Mich., and James M. Renga, Walnut Creek, Calif., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 487,537, Apr. 23, 1983, abandoned. This application Aug. 21, 1984, Ser. No. 642,859
Int. Cl.[4] C07D *491/044, 319/08, 213/14*
U.S. Cl. 546—115 17 Claims

1. A process for the preparation of ethenylidene-containing compounds corresponding to the formula:

wherein R and R′ are individually the same or different monovalent suitably inert $C_{1-20}$ organic radicals, or R and R′ are collectively a suitably inert divalent organic radical capable of forming a ring having the

moiety as a member of said ring comprising contacting a carbonyl-containing compound corresponding to the formula:

where R and R′ are as previously defined with dimethyl carbonate in the presence of a triorgano phosphine compound under conditions sufficient to form the desired ethenylidene compound.

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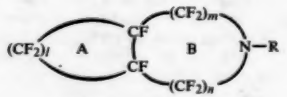
## 4,713,459
## PERFLUORO COMPOUNDS

Kazumasa Yokoyama, Toyonaka; Chikara Fukaya, Osaka; Yoshio Tsuda, Takarazuka; Taizo Ono, Osaka; Yoshio Arakawa, Suita, and Tadakazu Suyama, Kyoto, all of Japan, assignors to The Green Cross Corporation, Osaka, Japan

Division of Ser. No. 442,416, Nov. 17, 1982, Pat. No. 4,591,593. This application Feb. 18, 1986, Ser. No. 830,094
Claims priority, application Japan, Nov. 27, 1981, 56-191357; Jun. 25, 1982, 57-110200
Int. Cl.[4] A61K *31/47, 31/40*; C07D *209/10, 217/22*
U.S. Cl. 546—150 11 Claims

1. A perfluoro compound represented by the formula,



wherein R denotes a lower perfluoroalkyl group, l is an integer of 3 or 4, n+m is an integer of 2 or 3, provided that n may be zero, and at least one of the ring fluorines of ring A or ring B is optionally replaced by a lower perfluoroalkyl group.

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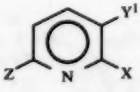
## 4,713,460
## 2,3-BIS-(POLY)(CHLOROMETHYL)PYRIDINES

Michael A. DesJardin, Dublin; Thomas J. Dietsche, Berkeley, and Jon A. Orvik, Walnut Creek, all of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 22, 1986, Ser. No. 888,897
Int. Cl.[4] C07D *211/72, 211/84*
U.S. Cl. 546—345 25 Claims

1. A 2,3-bis((poly)chloromethyl)pyridine compound of the formula



wherein

X and $Y^1$ each, independently represents $CH_2Cl$, $CHCl_2$, or $CCl_3$; and

Z represents hydrogen or chloro;

with the proviso that X and $Y^1$ do not both represent $CH_2Cl$ or $CCl_3$.

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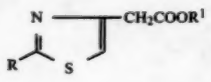
## 4,713,461
## PROCESS FOR PRODUCING GLUTACONIC ACID DERIVATIVES

Hiroshi Onoue, Nara, and Hiromi Takahashi, Hyogo, both of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

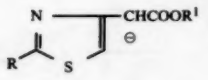
Filed Aug. 8, 1985, Ser. No. 763,784
Claims priority, application Japan, Aug. 24, 1984, 59-176954
Int. Cl.[4] C07D *277/38, 277/46*
U.S. Cl. 548—194 7 Claims

1. A process for producing a glutaconic acid compound by a condensation reaction of a thiazoleacetic acid compound (I) and an alkoxyacrylic acid compound (II) in the presence of a base, which comprises treating a thiazoleacetic acid compound (I) with a base selected from a hydride or lower alkoxide of an alkali metal to produce a carbanion (Ia), mixing this carbanion with an alkoxyacrylic acid compound (II) to produce an alkoxyglutaric acid compound (Ib), eliminating the alcohol $R^4OH$

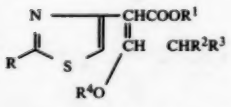
from the latter compound (Ib) to produce a glutaconic acid compound (III), and optionally hydrolysing the glutaconic acid compound (III) to produce free glutaconic acid compound (IV), said reaction being carried out in the presence of a solvent at a temperature of from −30° C. to 100° C. for 5 minutes to 10 hours, and wherein 1 to 3 equivalents of said alkoxyacrylic acid compound (II) is treated with said thiazoleacetic acid compound (I) in the presence of 2 to 5 molar equivalent of said base in 3 to 20 parts by weight of said solvent, said compounds (I), (Ia), (Ib), (II), (III) and (IV) having the formulas:



(I)

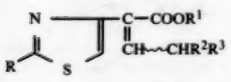


(Ia)

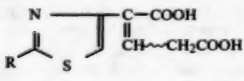


(Ib)

$R^4OCH{=}CR^2R^3$ (II)



(III)



(IV)

wherein,

R is amino or amino substituted by 1C to 5C alkanoyl, halo-1C to 5C-alkanoyl, 2C to 6C alkoxyformyl, 8C to 15C aralkoxyformyl, or 3C to 8C akylidene or aralkylidene;

$R^1$ is 1C to 8C alkyl, 1C to 5C haloalkyl, 1C to 5C akoxyalkyl, 1C to 8C sufonylalkyl, 2C to 5C alkenyl, or 7C to 15C aralkyl;

$R^2$ is hydrogen, cyano, or carboxy esterified by 1C to 8C alkyl, 1C to 5C haloakyl, 1C to 5C akoxyalkyl, 1C to 8C sulfonylalkyl, 2C to 5C alkenyl, or 7C to 15C aralkyl;

$R^3$ is hydrogen, cyano, or carboxy esterified by 1C to 8C alkyl, 1C to 5C haloalkyl, 1C to 5C akoxyalkyl, 1C to 8C sulfonylalkyl, 2C to 5C alkenyl, or 7C to 15C aralkyl; and

$R^4$ is 1C to 5C alkyl or 7C to 15C aralkyl.

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**4,713,462**

## FLAMEPROOFING AGENTS, THEIR PREPARATION AND THEIR USE FOR PROVIDING POLYCARBONATES WITH A FLAME-RESISTANT FINISH

**Hans-Jürgen Kress, Krefeld, and Klaus Kircher, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

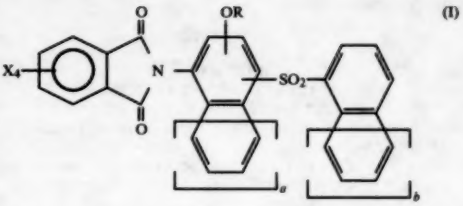
**Division of Ser. No. 661,770, Oct. 17, 1984, Pat. No. 4,661,543. This application Nov. 26, 1986, Ser. No. 935,448**

**Claims priority, application Fed. Rep. of Germany, Oct. 18, 1983, 3337857**

**Int. Cl.[4] C07D** *209/48*

**U.S. Cl. 548—473** **8 Claims**

1. A phthalimide of the general formula



(I)

wherein

X denotes hydrogen or up to four halogen atoms,

a and b independently of each other denote 0 or 1 and

R denotes a $C_1$–$C_4$-alkyl radical.

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**4,713,463**

## SYNTHESIS OF N-EPOXYPROPYL LACTAMS

**Ratan K. Chaudhuri, Butler; Robert B. Login, Oakland, and David J. Tracy, Lincoln Park, all of N.J., assignors to GAF Corporation, Wayne, N.J.**

**Filed Oct. 24, 1986, Ser. No. 922,922**

**Int. Cl.[4] C07D** *207/12, 223/10, 211/40*

**U.S. Cl. 548—517** **8 Claims**

1. The liquid phase process which comprises epoxylating a lactam having from 4 to 6 carbon atoms with an epihalohydrin selected from the group of epichlorohydrin and epibromohydrin in the presence of an aqueous alkali metal hydroxide solution employed in a concentration at least as high as 60% or in the presence of 100% alkali metal hydroxide and a quaternized catalyst selected from the group having the formulae:

wherein n is an integer having a value of from 3 to 10; R is alkyl having from 4 to 12 carbon atoms and $X^-$ is $Cl^-$ or $Br^-$, to produce the corresponding N-epoxypropyl lactam.

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**4,713,464**

## PROCESS FOR PRODUCTION OF MALEIC ANHYDRIDE

**Carlo Fumagalli, Valbrembo, and Giancarlo Stefani, Bergamo, both of Italy, assignors to Alusuisse Italia, S.p.A., Milan, Italy**

**Division of Ser. No. 789,151, Oct. 18, 1985, Pat. No. 4,668,652. This application Jan. 27, 1986, Ser. No. 819,599**

**Claims priority, application Italy, Nov. 20, 1984, 23671 A/84**

**Int. Cl.[4] C07D** *307/60*

**U.S. Cl. 549—259** **13 Claims**

1. The method comprising partially oxidizing 1,3-butadiene, n-butane, but-1-ene, cis-but-2-ene, trans-but-2-ene or a mixture of at least two of said compounds, to maleic anhydride in the presence of a catalyst, said catalyst consisting of a vanadium/-phosphorus complex oxide, the catalyst containing 1 to 1.3 atoms of phosphorus per atom of vanadium, the catalyst having pores, the pore volume of those pores which have a radius of 100 to 1,000 Å is at 30 percent of the total pore volume of the pores which have a radius of less than 10,000 Å, the catalyst being produced by the method comprising introducing a phosphorus-containing compound into an organic solvent, continuously adding a vanadium-containing compound to the reaction mixture over the course of 0.5 to 4 hours, 1 to 1.3 atoms of phosphorus being employed per atom of vanadium, continuously removing the water formed during the reaction directly from the reaction mixture, separating the reaction mixture, removing the solvent from the formed V-P-O complex oxide at a temperature of 90° to 150° C. and activating the

V-P-O complex oxide at a temperature of 200° to 300° C. to provide the catalyst.

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**4,713,465**

**FLAVANONE INTERMEDIATES FOR HALOGENOHYDROXYFLAVONES**

**Josef Krämer, Seeheim-Jugenheim; Klaus Irmscher, Darmstadt; Helmut Prücher, Heppenheim, and Rolf-Dieter Hesch, Hannover-Kleefeld, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Fed. Rep. of Germany**

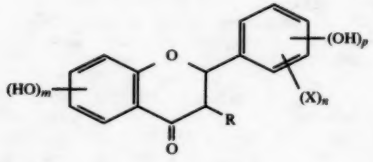
**Filed Nov. 26, 1985, Ser. No. 801,703**

**Claims priority, application Fed. Rep. of Germany, Nov. 26, 1984, 3443007; Feb. 19, 1985, 3505611**

**Int. Cl.[4] C07D** *311/32*

**U.S. Cl. 549—403** **1 Claim**

1. A flavanone of the formula



wherein

R is alkyl of 1–3 C atoms,

X is F, Cl, Br or I, and

each of m, n and p is 1, 2 or 3, and the sum of n and p is not more than 5.

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**4,713,466**

**PROCESS FOR THE PREPARATION OF ISOSORBIDE-5-MONONITRATE**

**Ottorino De Lucchi; Fabiola Filippuzzi; Giorgio Modena, all of Padova, and Ettore Camera, Gorizia, all of Italy, assignors to Consiglio Nazionale Delle Richerche, Rome and Dinamite, Udine, both of, Italy**

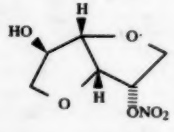
**Filed May 12, 1986, Ser. No. 861,705**

**Claims priority, application Italy, May 10, 1985, 20660 A/85**

**Int. Cl.[4] C07D** *493/04*

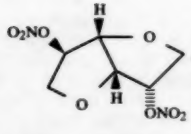
**U.S. Cl. 549—464** **10 Claims**

1. A process for the preparation of isosorbide-5-mononitrate (I)



(I)

from isosorbide-2,5-dinitrate (II)



(II)

wherein the isosorbide-2,5-dinitrate (II) is treated, in a reaction medium consisting of an organic solvent either containing or not containing water, with a reduction system in the presence of not easily oxidisable coordinating metal ions.

**4,713,467**

**PROCESS FOR PRODUCTION OF ISOTHIOCYANATES**

**Jeffrey E. Telschow, Tarrytown, and Danielle A. Bright, Spring Valley, both of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.**

**Filed Nov. 6, 1986, Ser. No. 927,478**

**Int. Cl.[4] C07C** *161/04*

**U.S. Cl. 558—18** **10 Claims**

1. A process for forming an isothiocyanate which comprises oxidizing, with an oxygen-containing gas, a dithiocarbamate in the presence of a metal oxidation catalyst with adjustment of the pH to suppress the formation of undesired by-product.

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**4,713,468**

**TOLAN-TYPE NEMATIC LIQUID CRYSTALLINE COMPOUNDS**

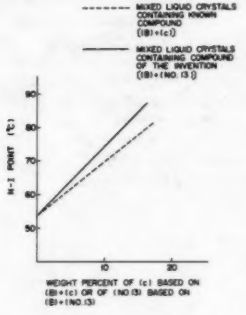
**Haruyoshi Takatsu, Kodaira; Makoto Sasaki, Urawa; Yasuyuki Tanaka, and Hisato Sato, both of Tokyo, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan**

**Division of Ser. No. 692,570, Jan. 18, 1985. This application Feb. 11, 1987, Ser. No. 14,259**

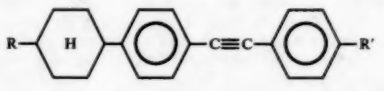
**Claims priority, application Japan, Jan. 23, 1984, 59-8519; Jan. 24, 1984, 59-10658; Mar. 29, 1984, 59-59588; Mar. 29, 1984, 59-59589; Jun. 19, 1984, 59-124489; Dec. 11, 1984, 59-261413; Dec. 11, 1984, 59-261414**

**Int. Cl.[4] C09K** *19/30, 19/54;* **C07C** *121/50, 25/24*

**U.S. Cl. 558—411** **5 Claims**




1. A compound of the general formula



wherein R represents a linear alkyl group having 1 to 10 carbon atoms, R′ represents a linear alkyl group having 1 to 10 carbon atoms, a cyano group or a halogen atom; and the cyclohexane ring has a trans(equatorial-equatorial) configuration.

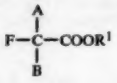
4,713,469

## FLUORINE-CONTAINING MULTIFUNCTIONAL ESTER COMPOUND

Yoshio Takeuchi, Kosugi; Toru Koizumi, Toyama, and Kozo Hori, Kosui, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 808,564, Dec. 13, 1985, abandoned. This application Mar. 27, 1986, Ser. No. 845,106
Claims priority, application Japan, Mar. 1, 1985, 60-41619; Mar. 1, 1985, 60-41620
Int. Cl.[4] C07C *117/00, 69/14*
U.S. Cl. 560—17 2 Claims

1. A fluorine-containing multi-functional ester compound of the formula:



wherein A is $NO_2$, Br or $N_3$, B is $C_6H_5S$ or $C_2H_5S$, provided that when A is $N_3$ then B may also be Br, $R^1$ is selected from the group consisting of alkyl of 1 to 4 carbon atoms, phenyl, chlorophenyl, tolyl, xylyl, naphthyl, benzyl and phenethyl.

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4,713,470

## RACEMIZATION OF AMINO ACIDS

Stanley B. Mirviss, Stamford, Conn., assignor to Stauffer Chemical Company, Westport, Conn.

Filed May 22, 1985, Ser. No. 736,724
Int. Cl.[4] C07B *57/00*
U.S. Cl. 560—38 21 Claims

1. A process for the racemization of an optical isomer of an alpha amino acid or derivative thereof which comprises contacting said optical isomer under conditions conductive to racemization with, as a racemization catalyst the product formed when a hydroxy aromatic aldehyde is reacted with a chloroalkyl-substituted vinylbenzene polymer wherein the number of repeating polymer units ranges from about 100 to about 1,000,000 under reaction conditions so as to form an aromatic aldehyde-containing polymer wherein the aldehyde-substituted aromatic moiety is linked to the polymer through an ether linkage.

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4,713,471

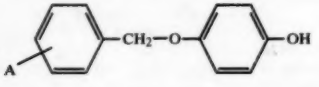
## METHOD FOR THE PREPARATION OF BENZYLOXYPHENOXY PENTANOATES

Richard W. Brown, Richmond, and Richard D. Gless, Jr., Oakland, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

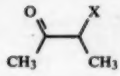
Filed Aug. 15, 1986, Ser. No. 896,794
Int. Cl.[4] C07C *69/76*
U.S. Cl. 560—53 10 Claims

1. A method for the preparation of benzyloxyphenoxy pentanoates which comprises the steps of:

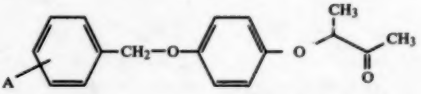
(a) reacting a benzyloxyphenol of the formula



wherein A is selected from the group consisting of hydrogen, lower alkyl having from 1 to 5 carbon atoms, or halogen, with a 3-halo-2-butanone of the formula



wherein X is selected from the group consisting of chlorine, iodine or bromine, in the presence of a base selected from carbonate salts of alkaline earth or alkali metals, a catalyst selected from the group consisting of alkali metal salts of iodine or bromine, preferably potassium iodide or sodium iodide, and a ketonic solvent preferably selected from the group consisting of methyl ethyl ketone, methyl isobutyl ketone or acetone, to produce a 3-(4-benzyloxyphenoxy)-2-butanone of the formula



wherein A is as previously defined; and

(b) reacting said 3-(4-benzyloxyphenoxy)-2-butanone with a dialkyl carbonate of the formula $(RO)_2CO$, wherein R is an alkyl group having from 1 to 4 carbon atoms in the presence of a base selected from an alkali or alkaline earth metal alkoxide or an alkali or alkaline earth metal or their hydrides, and an organic solvent to form 4-(4-benzyloxyphenoxy)-3-oxopentanoate.

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4,713,472

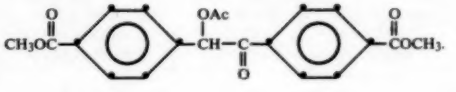
## PREPARATION OF DIMETHYL 4,4'-STILBENEDICARBOXYLATE AND INTERMEDIATES THEREFOR

Dale E. Van Sickle, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 15, 1986, Ser. No. 863,274
Int. Cl.[4] C07C *69/76, 67/313, 67/32*
U.S. Cl. 560—53 10 Claims

1. The process for preparing 4,4'-dimethylstilbenedicarboxylate comprising acetylating 4,4'-bis(methoxycarbonyl)benzoin to 4,4'-bis(methoxycarbonyl)benzoin acetate, hydrogenating 4,4'-bis(methoxycarbonyl)benzoin acetate to 1,2-bis(4-methoxycarbonylphenyl)ethanol, subjecting the 1,2-bis(4-methoxycarbonylphenyl)ethanol to either (1) dehydration at from about 20° C. to about 250° C. to produce the 4,4'-dimethylstilbenedicarboxylate, or (2) acetylation to produce 1,2-bis(4-carbomethoxyphenyl)-1-acetoxy ethane, which is then pyrolyzed at from about 200° C. to about 450° C. to produce the 4,4'-dimethylstilbenedicarboxylate.

7. The compound of the formula



4,713,473

## PROCESS FOR TREATING 2-ETHYLHEXYL P-METHOXYCINNAMATE IN THE PRESENCE OF A PHENOL

Peter Schudel, Grüt; Rolf Schwarzenbach, Winterthur, and Hans U. Gonzenbach, Geneva, all of Switzerland, assignors to Givaudan Corporation, Clifton, N.J.

Filed Jan. 8, 1987, Ser. No. 1,279

Claims priority, application Switzerland, Jan. 15, 1986, 128/86; Oct. 16, 1986, 4137/86

Int. Cl.[4] C07C *69/76*

U.S. Cl. 560—053 7 Claims

1. A process for the treatment of 2-ethylhexyl p-methoxycinnamate which comprises heating 2-ethylhexyl p-methoxycinnamate in the presence of a phenol at a temperature of from about 150° C. to about 230° C. for a time sufficient to provide a material which tests Ames negative.

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4,713,474

## ALKANEDICARBOXYLIC DIESTER COMPOUNDS

Hiroyuki Akashi, Chikujo; Takeshi Inoue, and Shoichi Horie, both of Nakatsu, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

PCT No. PCT/JP85/00641, § 371 Date Jul. 3, 1986, § 102(e) Date Jul. 3, 1986, PCT Pub. No. WO86/03193, PCT Pub. Date Jun. 5, 1986

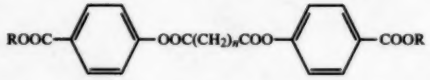
PCT Filed Nov. 16, 1985, Ser. No. 887,452

Claims priority, application Japan, Nov. 20, 1984, 59-245672; May 21, 1985, 60-109867

Int. Cl.[4] C07C *69/76*

U.S. Cl. 560—66 1 Claim

1. An alkanedicarboxylic diester compound represented by the formula:




wherein n is an integer of 0–8 and R is benzyl group.

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4,713,475

## LONG CHAIN (4-HYDROXYPHENYL) PROPANOATE STABILIZERS

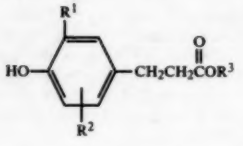
John D. Spivack, Spring Valley; David H. Steinberg, New York, both of N.Y., and Paul A. Odorisio, Edgewater, N.J., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 12, 1986, Ser. No. 873,556

Int. Cl.[4] C07C *69/76*

U.S. Cl. 560—75 13 Claims

1. A compound of the formula




wherein

$R^1$ and $R^2$ are independently alkyl of 1 to 18 carbon atoms, cycloalkyl of 5 to 6 carbon atoms, phenyl, phenyl substituted by alkyl of 1 to 18 carbon atoms, aralkyl of 7 to 9 carbon atoms or said aralkyl substituted by alkyl of 1 to 18 carbon atoms; and

$R^3$ is alkyl of 35 to 50 carbon atoms or mixtures thereof.

4,713,476

## PROCESS FOR THE PREPARATION OF ALIPHATIC DI- AND POLYURETHANES

Franz Merger, Frankenthal, and Friedrich Towae, Ludwigshafen, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 135,247, Mar. 31, 1980. This application Jun. 26, 1986, Ser. No. 879,025

Claims priority, application Fed. Rep. of Germany, Apr. 30, 1979, 2917493

Int. Cl.[4] C07C *125/073*

U.S. Cl. 560—115 18 Claims

1. A process for the preparation of bis- or higher functional N-alkylcarbamates comprising:

(a) reacting an aliphatic primary di- or polyamine with urea and a primary or secondary aliphatic alcohol in an amino-group to urea to alcohol ratio of from about 1:0.9:1 to 1:5:20 at a temperature of from in excess of 190° C. to about 300° C.; and

(b) separating the bis- or higher functional N-alkyl carbamate product from unreacted and partly reacted starting materials, impurities, and by-products.

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4,713,477

## OMEGA CYCLOALKYL PROSTAGLANDINS

Paul W. Collins, Deerfield, and Alan F. Gasiecki, Vernon Hills, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

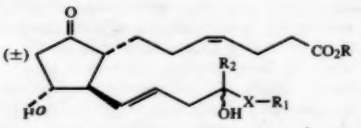
Continuation-in-part of Ser. No. 669,137, Nov. 7, 1984, which is a continuation-in-part of Ser. No. 551,238, Nov. 14, 1983, Pat. No. 4,499,296. This application Nov. 14, 1985, Ser. No. 798,197

The portion of the term of this patent subsequent to Feb. 12, 2002, has been disclaimed.

Int. Cl.[4] C07C *177/00*

U.S. Cl. 560—118 9 Claims

1. A compound of the formula




wherein

R represents hydrogen or lower alkyl containing 1 to 6 carbon atoms;

X represents —$CH_2$—, —CH=CH—, —C≡C—, —C≡C-$CH_2$—, —CH=CH-$CH_2$—, —$CH_2$-$CH_2$—$CH_2$—, —$CH_2$-CH=CH—, —$CH_2$-C≡C—; and $R_1$ represents cyclopropyl, cyclobutyl, cyclopentyl, or 1-methylcyclopropyl or 1-methylcyclobutyl or $XR_1$ together represent 1-methyl-1-cyclopropylethyl or 1-methyl-1-cyclobutylethyl; $R_2$ represents lower alkyl having 1 to 4 carbons vinyl or ethynyl and the wavy line represents optional R or S stereochemistry.

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4,713,478

## PROCESS FOR THE PREPARATION OF DIALKYL 2-VINYLCYCLOPROPANE-1,1-DICARBOXYLATES

Richard G. Fayter, Jr., Fairfield, Ohio, assignor to National Distillers and Chemical Corporation, New York, N.Y.

Filed Nov. 28, 1986, Ser. No. 936,001

The portion of the term of this patent subsequent to Dec. 15, 2004, has been disclaimed.

Int. Cl.[4] C07C *69/743*

U.S. Cl. 560—124 6 Claims

1. A process of preparing dialkyl 2-vinylcyclopropane-1,1-dicarboxylates which comprises condensing a di lower alkyl malonic ester with a 1,4-dihalobutene-2 in the presence of an alcoholic solution of a metallic alkoxide and recovering the dialkyl 2-vinylcyclopropane-1,1dicarboxylate so produced.

4,713,479

## SYNTHESIS OF HIGH-PURITY DIALKYL 2-VINYLCYCLOPROPANE-1,1-DICARBOXYLATE

Clarence E. Clark, Jr., Cincinnati, and Richard G. Fayter, Jr., Fairfield, both of Ohio, assignors to National Distillers and Chemical Corporation, New York, N.Y.

Filed Nov. 28, 1986, Ser. No. 936,004

The portion of the term of this patent subsequent to Dec. 15, 2004, has been disclaimed.

Int. Cl.[4] C07C *69/743*

U.S. Cl. 560—124 8 Claims

1. A process of preparing dialkyl 2-vinyl-cyclo-propane-1,1-dicarboxylates which comprises the two-step reaction sequence of:

(a) contacting a mixture of trans-1,4-dihalobutene-2 and cis-1,4-dihalobutene-2 with a thiol catalyst or a hydrogen bromide or hydrogen chloride catalyst and an initiator for the reaction at a temperature from about 25° C. to about 80° C. and for a time sufficient to permit the conversion of substantially all of the cis-1,4-dihalobutene-2 to trans-1,4-dihalobutene-2, thereafter;

(b) cyclocondensing a di lower alkyl malonic ester with said trans-1,4-dihalobutene-2 in the presence of an alcoholic solution of a metallic alkoxide and recovering the high purity dialkyl 2-vinylcyclopropane-1,1-dicarboxylate so produced.

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4,713,480

## METHOD FOR THE PRODUCTION OF CRYSTALLINE AMINO-PROTECTED-BETA-BENZYL-L-ASPARTIC ACID

John M. Pascone, Neshanic Station, N.J., assignor to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Jan. 7, 1987, Ser. No. 1,076

Int. Cl.[4] C07C *125/065*

U.S. Cl. 560—157 13 Claims

1. A method for producing a crystalline amino-blocked beta-benzyl-L-aspartic acid which comprises

combining an oxycarbonyl compound providing an amino protecting group with beta-benzyl-L-aspartic acid and a tertiary amine organic base having a $pK_a$ value of about 9 to about 12 in the presence of water and a water-immiscible polar organic solvent, and at a pH value of about 7.5 to about 9, and maintaining the resulting combination of constituents for a time period sufficient to produce a non-aqueous solution of a salt of amino-blocked beta-benzyl-L-aspartic acid;

recovering said non-aqueous solution;

adding water and a water-insoluble, non-polar organic liquid phase modifier to said non-aqueous solution to produce a liquid having an aqueous phase and an organic liquid phase;

acidifying said liquid to a pH value of about 0.5 to about 2;

separating the organic liquid phase from the acidified liquid; and

adding an additional amount of said organic liquid phase modifier to the separated organic liquid phase sufficient to induce crystallization of amino-blocked beta-benzyl-L-aspartic acid from said separated organic liquid phase.

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4,713,481

## AMINE-FUNCTIONAL MONOETHYLENIC MONOMERS, ACRYLIC COPOLYMERS AND AQUEOUS COATING COMPOSITIONS CONTAINING THE SAME

Anthony J. Tortorello, Elmhurst, Ill., and Joseph D. Lukanich, Green Lake, Wis., assignors to DeSoto, Inc., Des Plaines, Ill.

Division of Ser. No. 865,784, May 22, 1986, Pat. No. 4,665,146. This application Oct. 30, 1986, Ser. No. 924,831

Int. Cl.[4] C07C *125/07*

U.S. Cl. 560—159 11 Claims

1. A monoethylenically unsaturated polymerizable monomer carrying a plurality of ketimine-blocked primary amine groups.

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4,713,482

## MALEIC OR PHTHALIC ACID HALF ESTERS OF ALKOXYLATED FATTY AMINES

Rosemarie Töpfl, Dornach, and Heinz Abel, Reinach, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

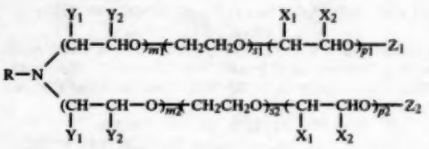
Filed Mar. 19, 1986, Ser. No. 841,420

Claims priority, application Switzerland, Mar. 26, 1985, 1314/85; Nov. 15, 1985, 4898/85

Int. Cl.[4] C07C *69/60, 69/80*

U.S. Cl. 560—196 14 Claims

1. A maleic acid or phthalic acid half ester of the formula



(1)

or a quaternary ammonium compound thereof, wherein

R is an aliphatic radical of 12 to 24 carbon atoms,

one of $Y_1$ and $Y_2$ is hydrogen and the other is phenyl,

one of $X_1$ and $X_2$ is hydrogen and the other is methyl,

one of $Z_1$ and $Z_2$ is hydrogen and the other is the maleic acid radical or the phthalic acid radical,

$m_1$ and $m_2$ are each 0 or 1,

$s_1$, $s_2$, $p_1$ and $p_2$ are integers, with the sum of $s_1+s_2$ being 25 to 50 and the sum of $p_1+p_2$ being 4 to 15.

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4,713,483

## PROCESS FOR THE PRODUCTION OF OXALIC ACID DIESTERS

Klaus Langerbeins, Langen; Günther Schröder, Ober-Ramstadt, and Hans-Peter Boehm, Ottobrunn, all of Fed. Rep. of Germany, assignors to Röhm GmbH Chemische Fabrik, Darmstadt, Fed. Rep. of Germany

Filed Apr. 9, 1986, Ser. No. 849,858

Claims priority, application Fed. Rep. of Germany, Apr. 13, 1985, 3513255

Int. Cl.[4] C07C *67/36*

U.S. Cl. 560—204 23 Claims

1. The process for the production of a diester of oxalic acid, which comprises oxidatively carbonylating an alcohol with carbon monoxide and oxygen as oxidizers at a pressure of from 1 to 700 atmospheres and at a temperature of from 20° to 250° C. in a reaction phase which contains the said alcohol and a catalyst comprising palladium and at least one metal halide in catalytically effective amounts, together with an activated carbon which is pretreated before use by heating to 200° to 1500° C. in a gas atmosphere that is different from air and which contains at least one of the following gases:

(a) nitrogen

(b1) ammonia or an alkyl derivative of ammonia;

(b2) hydrazine or an alkyl derivative of hydrazine;

(b3) hydrogen cyanide, dicyanogen or an alkyl nitrile;

(b4) an unsaturated nitrile;

(b5) an amide or a hydrazide of a $C_1$–$C_2$ carbonic acid or an N-alkyl derivative of an amide or a hydrazide of $C_1$–$C_2$ carbonic acid; or

(c) carbon monoxide.

## 4,713,484
## SINGLE PHASE CARBONYLATION OF AROMATIC HALIDES TO CARBOXYLIC ACID SALTS

**Ronald A. Epstein, Yonkers, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.**

**Continuation-in-part of Ser. No. 796,687, Nov. 12, 1985. This application Dec. 22, 1986, Ser. No. 945,257**

**Int. Cl.[4] C07C *51/14***

**U.S. Cl. 562—406** **29 Claims**

1. A process for preparing carboxylic acid salts comprising the single phase carbonylation of at least one organic halide in the presence of an alcohol, CO, and a base in conjunction with a palladium catalyst and an excess of tertiary phosphine, and wherein the base and excess phosphine is added during the reaction at a rate necessary to prevent side-product formation and catalyst decay.

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## 4,713,485
## PROCESS FOR PREPARING α-HYDROXY-ALKANOIC ACIDS AND COMPOUNDS OBTAINED BY THIS PROCESS

**Jean-Daniel Andre, Sisteron; Pierre-Jean Grossi, Aramon; Alain Heymes, Sisteron, all of France, and Giovanni V. Manzaroli, Milan, Italy, assignors to SANOFI and Industria Chimica Prodotti FRANCIS S.p.A., Paris, France**

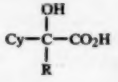
**Filed Nov. 21, 1985, Ser. No. 800,228**

**Claims priority, application France, Nov. 29, 1984, 84 18201**

**Int. Cl.[4] C07C *59/48***

**U.S. Cl. 562—470** **9 Claims**

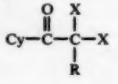
1. Process for preparing α-hydroxy-alkanoic acids of formula:



I

in which R represents a lower alkyl radical and Cy represents phenyl or a heterocyclic radical, both radicals optionally containing one or more subtituents selected from the group consisting of lower alkyl, lower alkenyl, lower alkynyl radicals and halogen atoms, wherein:

an α,α-dihalogenated ketone of formula:



II

in which R and Cy have the same meaning as above and X represents chlorine, bromine or iodine is treated in the presence of an aqueous solution of an alkali metal hydroxide and of a non polar organic solvent which is an aromatic or alicyclic hydrocarbon, the treatment being carried out at a temperature between the boiling temperature of the reaction medium at atmospheric pressure and 240° C. under pressure

the alkali metal so formed is then acidified to obtain the desired acid.

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## 4,713,486
## NOVEL COMPOUNDS

**Derek R. Buckle, Redhill, England, assignor to Beecham Group p.l.c., Brentford, England**

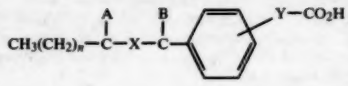
**Filed Oct. 21, 1985, Ser. No. 789,571**

**Claims priority, application United Kingdom, Nov. 11, 1982, 8232229; Nov. 12, 1982, 8232430; Nov. 23, 1982, 8233341; Jun. 10, 1983, 8315963; Jun. 21, 1983, 8316809; Jul. 6, 1983, 8318263; Jul. 30, 1983, 8320592**

**Int. Cl.[4] C07C *63/64***

**U.S. Cl. 562—495** **13 Claims**

1. A compound of formula (I):



(I)

or a salt, ester or amide thereof,

in which

Y is a group $-O(CH_2)_m-$, $-(CH_2)_m-$ or $-CH=CH-$ where

m is an integer of from 1 to 5

n is an integer of from 4 to 14

X represents a double or triple bond, and each of A and B represents hydrogen when X is a double bond, or both A and B are absent when X is a triple bond.

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## 4,713,487
## ETHER CARBOXYLATES AND PROCESS FOR PREPARING SAME

**Fumimaro Sekine, Wakayama; Tomihiro Kurosaki, Osaka; Toshinao Ukena, and Hiroshi Kamitani, both of Wakayama, all of Japan, assignors to Kao Corporation, Tokyo, Japan**

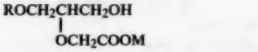
**Filed May 22, 1986, Ser. No. 865,859**

**Claims priority, application Japan, Jun. 6, 1985, 60-123315; Jun. 25, 1985, 60-138484**

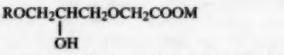
**Int. Cl.[4] C07C *59/255***

**U.S. Cl. 562—587** **2 Claims**

1. An ether carboxylate of the general formula (Ia) or (Ib)



(Ia)



(Ib)

in which R represents a linear or branched alkyl or alkenyl group having from 4 to 32 carbon atoms and M represents hydrogen, alkali metal, alkanolammonium or lower alkylammonium.

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## 4,713,488
## METHOD FOR PRODUCING CYCLOALKYL AMINOPHENOL DERIVATIVES

**Masayuki Omatsu; Naoki Yonese, both of Nishinomiya, and Mitsuru Kondo, Hyogo, all of Japan, assignors to Kanzaki Paper Manufacturing Co., Ltd., Tokyo, Japan**

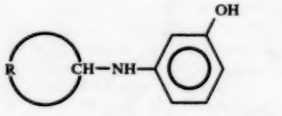
**Filed Oct. 11, 1985, Ser. No. 786,546**

**Claims priority, application Japan, Oct. 23, 1984, 59-223587**

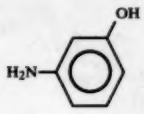
**Int. Cl.[4] C07C *85/08***

**U.S. Cl. 564—397** **4 Claims**

1. A method for producing a cycloalkyl aminophenol of the formula:



wherein R is a saturated hydrocarbon radical having 4 to 11 carbon atoms, which comprises reacting an aminophenol of the formula:



with a cycloalkanone of the formula:

wherein R is as defined above, in the presence of a combination of a catalytic hydrogenation agent and hydrogen as a reducing agent, and an acid selected from the group consisting of mineral acids and alkanoic acids of 1 to 5 carbon atoms in an amount of 0.8 to 1.2 equivalents versus one equivalent of the aminophenol, at a temperature of from 5° C. to 50° C. and under a pressure of from atmospheric pressure to elevated pressure of less than 10 kg/cm$_2$.

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**4,713,489**

**PREPARATION OF N-SUBSTITUTED ARYLSULFONAMIDES**

**Gail H. Birum, Kirkwood, and Richard F. Jansen, St. Louis, both of Mo., assignors to Akzo America Inc., New York, N.Y.**

**Continuation of Ser. No. 662,923, Oct. 19, 1984. This application Jan. 16, 1986, Ser. No. 820,876**

**Int. Cl.$^4$ C07C *143/79***

**U.S. Cl. 564—90** **18 Claims**

1. A process for the preparation of N-substituted arylsulfonamides comprising the steps of: (a) reacting an aryl hydrocarbon with chlorosulfonic acid to form a crude chlorosulfonation reaction product, (b) combining said crude reaction product, an aliphatic amine, an alkali metal hydroxide or alkaline earth metal hydroxide and water in reactive contact to form an amidation reaction mixture, (c) maintaining the temperature of the amidation reaction at between about 50° C. and 100° C. and the pH at above about 7, for a period of time sufficient to form an amidation reaction product comprising an organic phase and an aqueous phase, said organic phase being rich in N-substituted arylsulfonamide, and said aqueous phase containing mostly by-products of said amidation reaction product, (d) separating said organic phase from said aqueous phase and (e) recovering said N-substituted arylsulfonamide from said organic phase.

**4,713,490**

**PROCESS FOR THE PREPARATION OF ALKYLTHIOACETAMIDINES**

**Michael Arndt, Wuppertal, and Hans P. Sehnem, Schwelm, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

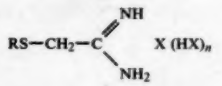
**Filed Nov. 27, 1985, Ser. No. 802,799**

**Claims priority, application Fed. Rep. of Germany, Dec. 6, 1984, 3444494**

**Int. Cl.$^4$ C07C *123/00***

**U.S. Cl. 564—225** **10 Claims**

1. A process for the preparation of an alkylothioacetamidine of the formula



in which

R represents alkyl,

X represents halogen and

n represents 0 or 1,

wherein

(a) a chloroacetonitrile of the formula

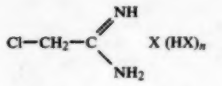
$ClCH_2CN$

is reacted with an ammonium halide of the formula

$NH_4X$

in which

X has the meaning indicated above, in the presence of an alkali metal alcoholate and in the presence of an alcohol at a temperature between −20° C. and ±30° C., to give a chloroacetamidine of the formula



in which

X and n have the meaning indicated above, and

(b) the cholroacetamidine is then reacted, if desired without being isolated, with an alkyl mercaptan of the formula

RSH

in which

R has the meaning indicated above, in the presence of an acid acceptor and in the presence of an alcohol at a temperature of between −20° C. and ±30° C. and under a pressure between 1 and 10 bar, to give an alkylthioacetamidine wherein 0.01 to 0.2 mole of alkali metal alcoholate and 1 to 2.00 moles of ammonium halide are employed in stage (a) for 1 mole of chloroacetonitrile and 1 mole of acid acceptor and 1 mole of alkyl mercaptan are added in stage (b).

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**4,713,491**

**NINA'S BUTTERCUP-TIHITIAN SQUASH**

**Nina M. Adams, 16531 Eucalyptus Rd., Hesperia, Calif. 92345**

**Filed Sep. 23, 1985, Ser. No. 779,132**

**Int. Cl.$^4$ A01H *5/00***

**U.S. Cl. 800—1** **2 Claims**

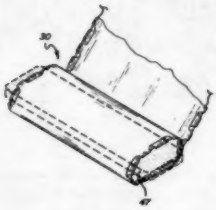
1. A new variety of winter squash known as Nina's Buttercup-Tihitian Squash.

4,713,492

## STOWABLE LARGE AREA SOLAR POWER MODULE

Joseph J. Hanak, Birmingham, Mich., assignor to Energy Conversion Devices, Inc., Troy, Mich.

Filed Oct. 21, 1985, Ser. No. 789,906
The portion of the term of this patent subsequent to Nov. 27, 2001, has been disclaimed.
Int. Cl.[4] H02N 6/00
U.S. Cl. 136—245 15 Claims



1. A stowable, deployable large area solar module comprising: a plurality of discrete, interconnected, flexible, large area solar panels; hinge means operatively disposed on said panels so as to provide for the relative planar displacement of the folded panels of said module when said panels are folded in overlying sandwiched relationship; said hinge means also operatively disposed so as to provide for the folded panels to be rolled into a stowable, substantially cylindrical configuration; said hinge means comprising:

a plurality of hinge knuckles associated with at least one edge of each large area panel, each of said knuckles including a passage therethrough adapted to receive pintle means, the knuckles of adjacent panels disposed in a spaced apart, generally coplanar, interdigitating relationship; and,

flexible pintle means disposed so as to sequentially pass through said interdigitating knuckles, whereby said spaced apart knuckles allow for a degree of planar displacement of adjoining large area panels relative to one another, as well as allowing for the folding of said panels in a sandwiched relationship and said flexible pintle means allows for said panels to be rolled into said substantially cylindrical configuration.

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4,713,493

## POWER GENERATING OPTICAL FILTER

Stanford R. Ovshinsky, Bloomfield Hills, Mich., assignor to Energy Conversion Devices, Inc., Troy, Mich.

Continuation-in-part of Ser. No. 786,579, Oct. 11, 1985, Pat. No. 4,642,413. This application Dec. 6, 1985, Ser. No. 806,232
The portion of the term of this patent subsequent to Feb. 10, 2004, has been disclaimed.
Int. Cl.[4] H01L 31/06; G02B 5/20
U.S. Cl. 136—249 7 Claims

1. A power generating optical filter including a transparent substrate; a first substantially transparent electrode disposed atop at least a portion of the substrate; a body of photovoltaic material adapted to generate electron hole pairs in response to the absorption of incident radiation, said body disposed atop at least a portion of the first electrode; and a second substantially transparent electrode disposed atop at least a portion of the body of photovoltaic material; the first and second electrodes and the body of photovoltaic material each fabricated to preselected thicknesses and from materials characterized by preselected indices of refraction for cooperatively establishing optical interference effects, whereby said filter transmits at least a portion of selected wavelengths of radiation incident thereupon substantially differing from wavelengths transmitted by that body of photovoltaic material alone; and

optical tuning layer means for modifying the optical transmission of the filter.

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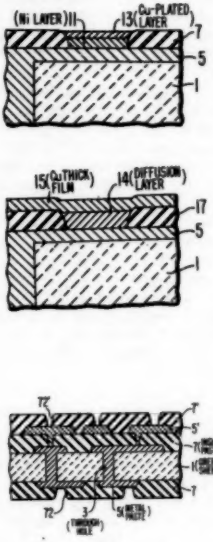
4,713,494

## MULTILAYER CERAMIC CIRCUIT BOARD

Shoji Oikawa, Yokohama; Hiroshi Yamagishi, Tokyo; Shigeru Saito, Yokohama; Tsuyoshi Fujita, Yokohama, and Takayoshi Watanabe, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 14, 1986, Ser. No. 851,729
Claims priority, application Japan, Apr. 12, 1985, 60-76574
Int. Cl.[4] H05K 1/00
U.S. Cl. 174—68.5 17 Claims




13. A multilayer circuit board comprising:

an insulating substrate;

a first layer on at least one side of said insulating substrate, said first layer comprising a material selected from the group consisting of Mo, W and Mo-Mn; and

a second layer on said first layer, said second layer comprising Cu and Ni.

4,713,495

## DEVICE FOR SENDING AND RECEIVING A MESSAGE

Antti Jalava, Paippinen, Finland, assignor to Näkövammaisten Keskusliitto ry, Helsinki, Finland

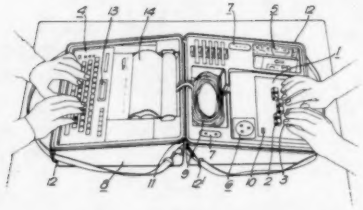
PCT No. PCT/FI86/00042, § 371 Date Jan. 2, 1987, § 102(e) Date Jan. 2, 1987, PCT Pub. No. WO86/06530, PCT Pub. Date Nov. 6, 1986

PCT Filed Apr. 30, 1986, Ser. No. 19,794

Claims priority, application Finland, May 2, 1985, 851745

Int. Cl.[4] H04L *15/00*

U.S. Cl. 178—2 R 8 Claims



1. Device for transmitting and receiving a message with the aid of the tactile sensation, characterized in that the equipment comprises, integrated in a box,

a console (1), which comprises several character keys (2), which can be placed in the mark position separately, as well as a corresponding number of feeling buttons (3), which can be placed in the mark position separately,

a control unit (6), by means of which a sign consisting of the keys placed in the mark position can be coded into an electric signal, as well as a coded electric signal be converted to a sign consisting of the mark positions of the feeling buttons,

a printer (4) connected to the control unit, by means of which printer a coded electric signal can be converted to an inkprint character, and an inkprint character be correspondingly converted to a coded signal,

a modem (6) connected to the control unit, by means of which said modem a coded electric signal can be modulated to a tele signal and be fed into the telecommunication network as well as a tele signal be recieved from the telecommunication network and be demodulated to a coded electric signal,

a recorder (5) connected to the control unit, in which a coded electric signal can be stored and out of which the said signal can be run back into the control unit,

a connecting device, by means of which the modem can be connected to a data communication network, and

a current source.

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4,713,496

## COORDINATE INPUT DEVICE

Kiyoshi Kimura, and Osamu Hara, both of Miyagi, Japan, assignors to Alps Electric Co., Ltd., Japan

Filed Jun. 2, 1986, Ser. No. 869,401

Claims priority, application Japan, May 31, 1985, 60-117761

Int. Cl.[4] G08C *21/00*

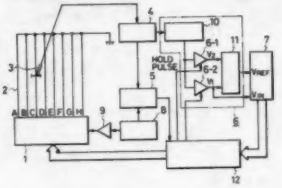
U.S. Cl. 178—18 3 Claims

1. A coordinate input device of the type in which scanning signals are supplied in sequence to conductors embedded in parallel in an input plane, and the coordinate values of a position is determined on the basis of detected signals by a coordinate indicator arbitrarily pointable on said input plane, comprising

a switching circuit for supplying scanning signals sequentially to a plurality of conductors embedded in parallel in said input plane in such a way that scanning signals of the same phase are applied concurrently to at least two of said conductors,

a coordinate indicator for detecting a signal derived from scanning signals transmitted on to said conductors in accordance with the operation of said switching circuit, and

a polarity discriminator for dicriminating inversion of the polarity of the signal detected by said coordinate indicator,



wherein, with special attention to the scanning position where inversion of the polarity has been discriminated by said polarity discriminator, the level of said signal is detected before and after the polarity of said signal detected by said coordinate indicator has been inverted, and a position is determined where said coordinate indicator is pointed on the basis of said position of polarity inversion discriminated and said signal level.

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4,713,497

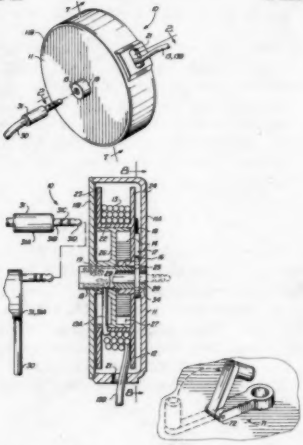
## SELF-STORING CORD AND REEL ASSEMBLIES FOR SHIELDED CABLES

John N. Smith, 2161 E. Gemini Dr., Tempe, Ariz. 85283

Filed Jun. 3, 1982, Ser. No. 384,729

Int. Cl.[4] H02G *11/00*

U.S. Cl. 191—12.2 R 6 Claims



1. A retractable self-storing reel assembly for shielded and unshielded electrical cables comprising:

a casing,

a reel journaled for rotation in said casing,

said reel comprising an integral hollow hub, the inner periphery of which comprises a cable terminating socket,

a spring mounted within said casing to extend between said casing and said reel for rotatively biasing said reel in one direction,

a ratchet means extending between the inside periphery of said casing and said reel for controlling the rotational movement of said reel in a second rotative direction opposite to said first rotative direction,

one end of said hub providing an entranceway into said hub for the male end of an elongated first cable coaxially of

said reel, and the outer periphery of said hub in said casing forming an opening for receiving one end of a second cable mountable on said reel for connection to and termination in said hub, and

means providing an outlet in said casing for said second cable mountable on said reel in an area juxtapositioned to the peripery of said reel.

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**4,713,498**

## SWITCH GEAR

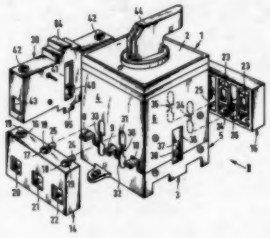
**Bernd Ludwig, Marienheide, and Dirk Stiehl, Gummersbach, both of Fed. Rep. of Germany, assignors to Square D Starkstrom GmbH, Fed. Rep. of Germany**

**Filed Oct. 15, 1986, Ser. No. 918,906**

**Claims priority, application European Pat. Off., Oct. 24, 1985, 85113511.1**

**Int. Cl.⁴ H01H** *9/00, 15/00*

**U.S. Cl. 200—5 R** **24 Claims**



1. A switch gear comprising a housing including opposite first and second sides and a third side therebetween, at least one main contact bridge in said housing means for supporting said main contact bridge for displacement between two switch positions, actuating means accessible at said third side for displacing said one main contact bridge between said two switch positions, two fixed contact rails carried by said housing and cooperating with said one main contact bridge for effecting therewith one closed and one open switch position, first and second of said two fixed contact rails being connectable by connector screws to electrical hook-up leads at said respective first and second housing sides, first and second separate housing compartments adjacent said respective first and second housing sides and housing associated ones of said connector screws, means for connecting said first and second fixed contact rails through said respective first and second separate housing compartments for connecting to said electrical hook-up leads by said connector screws, and means for selectively mounting said first and second separate housing compartments to the respective first and second housing sides at two positions mutually displaced by 180° whereby said connector screws can be accessed from two different opposing directions.

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**4,713,499**

## OPERATION CONTACT SYSTEM OF TRANSMITTER FOR THE RADIO-CONTROLLING TOY

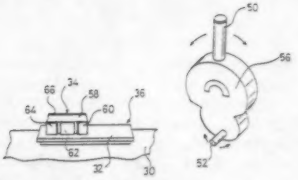
**Zenichi Ishimoto, Tokyo, Japan, assignor to Nikko Co., Ltd., Tokyo, Japan**

**Filed Aug. 4, 1986, Ser. No. 892,945**

**Int. Cl.⁴ H01H** *15/00*

**U.S. Cl. 200—16 D** **1 Claim**

1. A contact system for a transmitter for use with a radio-controlled toy, comprising a printed circuit board having electrical contacts, a fixed contact assembly provided thereon and an externally operable movable contact assembly mounted in sliding relation to the fixed contact assembly; said fixed contact assembly comprising a contact plate electrically insulatingly carried by a horizontal plate for projection of a part of the contact plate therethrough, said horizontal plate being attached to said printed circuit board with said contact plate extending through said printed circuit board, said contact plate being provided at one side with a plurality of mutually electrically insulated contacts and at its opposite side with a single contact electrically insulated from said mutually insulated contacts, said horizontal plate being adapted to guide said externally operable contact assembly for movement relative to said plurality of contacts and said single contact, said plurality of contacts of the contact plate being connected to said contacts provided in said printed circuit board, said externally



operable contact assembly comprising a movable sliding member slidably embracing said fixed contact assembly and a guide channel for ensuring said sliding embracing movement of said fixed contact assembly, said sliding member having a contact piece of conductive metal wire shaped to engage selected ones of said plurality of contacts during movement of said sliding member and simultaneously engage said single contact, said sliding member having means cooperating with an operational means of an operational lever for thus moving said sliding member.

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**4,713,500**

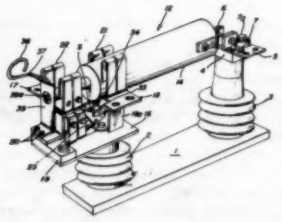
## ELECTRIC BYPASS SWITCH

**Anthony Osborne, Duluth, Ga., assignor to Kearney-National, Inc., Atlanta, Ga.**

**Continuation of Ser. No. 837,899, Mar. 10, 1986, abandoned. This application Mar. 27, 1987, Ser. No. 32,991**

**Int. Cl.⁴ H01H** *9/26, 31/10*

**U.S. Cl. 200—48 KB** **9 Claims**



1. An electric by-pass switch comprising a pair of spaced insulators, a pair of conductive terminals mounted on each of said insulators and insulated from each other, one pair of said conductive terminals being laterally spaced and adapted for connection with two terminals respectively of an electric apparatus and the other pair of said conductive terminals being laterally and longitudinally spaced and adapted for connection with infeed and outfeed power conductors respectively, a pair of laterally spaced hinge contacts hingedly mounted respectively on said one pair of said conductive terminals, a pair of longitudinally spaced jaw contacts mounted respectively on the other pair of said conductive terminals, conductive structure connected with one of said jaw contacts, a unitary rigid switch blade having a pair of concentric conductors comprising an inner conductor and an outer conductor fixed in position relative to each other and separated by mechanically strong insulating material therebetween, each concentric conductor

having two ends, the inner conductor of said concentric conductors projecting outwardly from each end of the outer one of said concentric conductors, corresponding ends of said pair of concentric conductors being pivotally secured to said hinge contacts respectively and the opposite ends of said pair of concentric conductors being engageable and disengageable with said jaw contacts respectively, a bypass conductor electrically connected with and movably mounted on said conductive structure, and means mounted on said switch blade for disjointably engaging said by-pass conductor for causing said bypass conductor to engage and to disengage the other of said jaw contacts.

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**4,713,501**

## PARTITIONED SWITCHING PANEL WITH INSERTABLE SWITCHING CARRIAGE AND ADJUSTABLE SHUTTER MECHANISM

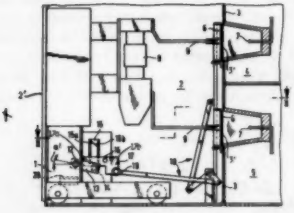
**Johann Herrmann, Regensburg, Fed. Rep. of Germany, assignor to Sachsenwerk AG, Regensburg, Fed. Rep. of Germany**

**Filed Dec. 5, 1986, Ser. No. 938,720**

**Claims priority, application Fed. Rep. of Germany, Dec. 5, 1985, 3542979**

**Int. Cl.[4] H01H *9/20*; H02B *1/14***

**U.S. Cl. 200—50 AA** **13 Claims**



1. In a partitioned switching panel including a power switch provided with first switch contacts and mounted on a carriage which is movable toward and away from cooperating stationary second switch contacts disposed behind a partition of the switching panel and accessible via openings in said partition, displaceable shutters mounted on said partitions for closing said openings when said first and second contacts are disconnected, and means for moving said carriage between a circuit breaking position wherein said first and second switch contacts are disconnected and an operating position wherein said first and second switch contacts are connected and for opening and closing said shutters when said carriage is in said circuit breaking position and such that the opening of said shutters is completed when movement of said carriage from said circuit breaking position toward said operating position begins; the improvement wherein said means for moving and for opening and closing comprises: a driven output shaft rotatably mounted on said carriage; an output lever having one end connected to said shaft for rotation therewith and having a cam follower mounted on its other end; a linear camming track fixedly mounted on said panel at a position to cooperate with said cam follower upon rotation of said shaft and such that initial movement along an initial section of said camming track when said carriage is at rest in said circuit breaking position does not result in movement of said carriage and continued movement of said cam follower along the remaining portion of said camming track causes movement of said carriage toward said operating position and said cam follower to traverse said track twice in opposite directions during such movement of said carriage to said operating position; a camming lever having first and second arms, said camming lever being rotatably mounted on said panel adjacent said camming track such that said first arm of said camming lever is engaged and pivoted by said cam follower during its said initial movement along said initial camming track section; and mechanical linkage means, connected to said second arm of said camming lever, for opening said shutters in response to said first arm being engaged and moved by said cam follower.

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**4,713,502**

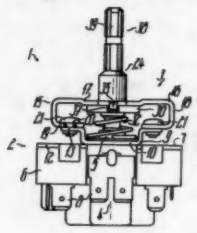
## CONTROLLER FOR CONTROLLING ELECTRICAL HEATERS

**Willi Essig, Boeblingen; Hans Mayer, Kuernbach, and Siegfried Mannuss, Sternenfels, all of Fed. Rep. of Germany, assignors to E.G.O. Elektro-Geräte Blanc u. Fischer, Fed. Rep. of Germany**

**Filed Oct. 17, 1985, Ser. No. 788,331**

**Int. Cl.[4] H01H *3/16***

**U.S. Cl. 200—61.82** **13 Claims**



1. An attachment for a controller for controlling supply of electric energy to at least one electrical heating element, said controller having a housing for an electrical controlling means and a regulating shaft rotatable to different regulating positions about a regulating axis, said regulating shaft projecting from a front face of said housing and having connection means adapted for directly connecting said regulating shaft with a regulating handle, said attachment means located near the front face of said housing, comprising:

slide-to-turn means mounted on an outside of said housing in a vicinity of the front face,

said slide-to-turn having cooperating rotation stop members disposed at a distance from said housing, said stop members being engagable to lock the regulating shaft against rotation in at least one position thereof, and disengagable to release said regulating shaft for rotation by a disengaging axial slide movement of said stop members relative to one another,

said stop members being movable relative to one another in a direction parallel to the regulating axis of said regulating shaft in at least two relative axial positions, thereby engaging the stop members in one axial locking position whereupon the regulating shaft is locked against rotation, and disengaging the stop members in another axial position, thereby releasing the regulating shaft for rotation,

said slide-to-turn means having an intermediate shaft with a coupling means engagable on the regulating shaft in place of the regulating handle.

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**4,713,503**

## THREE PHASE VACUUM SWITCH OPERATING MECHANISM WITH ANTI-BOUNCE DEVICE FOR INTERRUPTER CONTACTS

**Eugene L. Kamp, Fulton, Mo., assignor to A. B. Chance Company, Centralia, Mo.**

**Filed Aug. 26, 1986, Ser. No. 900,538**

**Int. Cl.[4] H08H *33/66***

**U.S. Cl. 200—144 B** **10 Claims**

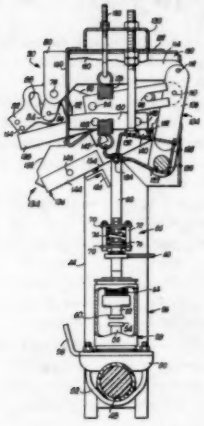
1. In an electrical switch having a pair of electrical contacts, a shaft supporting one of said contacts for movement with the latter between an open circuit position wherein said contacts are spaced from each other and a closed circuit position wherein said contacts are in direct engagement with each

other, and a spring loaded mechanism for moving said shaft toward said closed position, means for reducing the velocity of said shaft and said contact supported thereby as said shaft is moved by said spring loaded mechanism toward said closed circuit position and for suppressing bounce of said contacts after an initial engagement of the same comprising:

first elongated arm means presenting an impact surface;

pivot means mounting said first arm means to initially locate said impact surface in the path of said spring loaded mechanism as said mechanism moves said shaft toward said closed circuit position and for enabling swinging movement of said first arm means after initial contact of said impact surface with said mechanism in a direction initially away from the mechanism and subsequently back toward said mechanism to again contact the latter,

said initial contact of said impact surface with said mechanism causing said first arm means to absorb a portion of the kinetic energy of said mechanism and to thereby reduce the velocity of said shaft moved by said mechanism as said shaft shifts toward said closed circuit position;



second elongated arm means having an engagement surface; and

pivot means mounting said second arm means for free swinging movement toward and away from said first arm means during movement of said first arm means,

said pivot means mounting said second arm means being located to at least initially position said engagement surface of said second arm means in the path of swinging movement of said first arm means subsequent to initial impact of the latter by said mechanism, to cause said second arm means to absorb a portion of the kinetic energy of said first arm means that would otherwise be transferred from said first arm means back to said mechanism during subsequent rebounding contact therewith as said first arm means swings back toward said mechanism, and to thereby substantially reduce the kinetic energy transferred from said first arm means to said shaft in directions along the latter away from said closed circuit position so that the tendency of said contacts to separate by rebounding impact of said first arm means with said mechanism after said initial impact is.

**4,713,504**

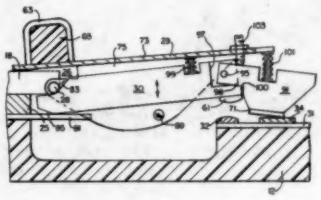
**CIRCUIT BREAKER WITH HINGED ARCING CONTACT**

**Alfred E. Maier, Chippewa, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 835,667, Mar. 3, 1986. This application Jan. 28, 1987, Ser. No. 7,859**

**Int. Cl.[4] H01H** *33/12*

**U.S. Cl. 200—146 R** **7 Claims**



1. A circuit breaker with arcing contacts comprising:

separable contact means including movable contact means and stationary contact means;

the movable contact means including a movable main contact and a movable arcing contact;

a contact carrier structure comprising a contact arm carrier and a plurality of parallel spaced contact arms;

the plurality of contact arms being pivotally mounted on a first pivot;

an operating mechanism for moving the contact carrier structure between open and closed positions of the movable and stationary contact means;

each contact arm comprises a movable main contact;

at least one of the parallel spaced contact arms supporting an arcing contact structure pivotally mounted on a second pivot on the arm, the second pivot being disposed between the first pivot and the arcing contact;

the arcing contact structure being biased toward the stationary contact means so as to remain in momentary contact with the stationary contact means until after the movable main contact disconnects therefrom; and

stop means between the contact arm carrier and the arcing contact structure and between the second pivot and the arcing contact for retaining the arcing contact structure in momentary contact with the stationary contact means, whereby any contact arcing occurring is diverted from the movable main contact.

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**4,713,505**

**LOAD BREAK SWITCH**

**K. Henry Date, and Ronald Wainio, both of So. Milwaukee, Wis., assignors to Cooper Industries, Inc., Houston, Tex.**

**Continuation of Ser. No. 373,613, Apr. 30, 1982, abandoned, which is a division of Ser. No. 231,279, Feb. 4, 1981, Pat. No. 4,343,030, which is a division of Ser. No. 940,104, Sep. 6, 1978, Pat. No. 4,293,834. This application Jan. 9, 1984, Ser. No. 568,941**

**Int. Cl.[4] H01H** *3/30*

**U.S. Cl. 200—153 SC** **2 Claims**

1. An operating mechanism for operating a disconnect switch having at least one pair of separable contacts movable to open and closed positions, which comprises:

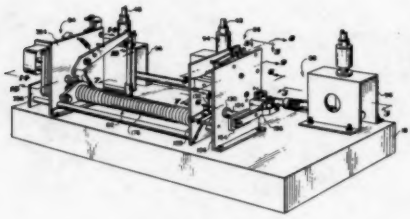
a frame;

an operating shaft supported by the frame for unidirectional rotation between two positions, the shaft being operably connected to effect opening of the disconnect switch when the shaft is rotated from its closed position to its open position, and to effect closing of the disconnect switch when the shaft is rotated from its open position to its closed position;

releasable latching means, for stopping and holding the shaft in either its closed or opened positions;

latch releasing means for momentarily releasing the latching means;

torsion spring means for rotating the shaft in one direction between its opened and closed positions and for rotating the shaft in the same direction between its closed and opened positions;



spring charging means for charging the torsion spring in one direction to a preset value of stored energy;

latch locking means, for locking the latching means so that it can not be released by the latch releasing means, whenever the operating shaft is in its opened position and the energy stored by the torsion spring means is less than a preset value.

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**4,713,506**

## ELECTRICAL CONTACT MAKING ARRANGEMENT FOR MONITORING THE CONDITION OF A SCREW IN AN INSTALLED POSITION

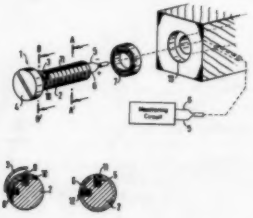
**Winfred Klink, Steinsdorfstrasse 1a, D-8000 München 22, Fed. Rep. of Germany**

**Filed Mar. 18, 1986, Ser. No. 840,739**

**Claims priority, application European Pat. Off., Mar. 20, 1985, 85 103249.0**

**Int. Cl.[4] H01B *3/40***

**U.S. Cl. 200—158** **12 Claims**



1. An electrical contact making arrangement for monitoring an angular position of a screw in an installed position thereof, the screw including at least a shank with a screw thread on at least a part thereof, the arrangement comprising first and second connecting contact means for connection to a monitoring circuit, a bridging contact on a portion of the shank of the screw extending in a peripheral direction thereof over only part of the periphery thereof, and a member disposed in an installed position of the arrangement around the portion of the shank having the bridging contact, the member moving the bridging contact to open and close the circuit when the screw is turned out of a reference set position.

**4,713,507**

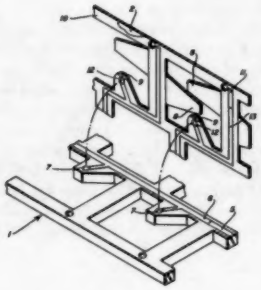
## KEY OPERATED SWITCH FOR KEYBOARD

**Gottfried Burkhardt, Am Bahndamm 29, D8501 Winkelhaid, Fed. Rep. of Germany**

**Filed Oct. 3, 1986, Ser. No. 914,786**

**Int. Cl.[4] H01H *13/52***

**U.S. Cl. 200—159 A** **1 Claim**



1. A key operated switch for keyboards comprising a key support,

a first printed conductor on said support,

a first insulating layer coating said first conductor except for a bared contact portion thereof,

a spring having an outer configuration overlying said key support having central cutouts defining a spring contact element inwardly directed from said outer configuration and two key return springs inwardly directed from said outer configuration,

a second insulating layer coating a side of said spring facing said first conductor,

a second printed conductor overlying said second insulating layer,

a third insulating layer covering said second conductor except for a bared contact portion thereof,

a key guide overlying said spring, and

a depressible key stem supported in said guide acting against said return springs and on said contact element to bring the bared contact portion of the second printed conductor into contact with said bared contact portion of said first printed conductor, thereby to connect said first and second printed conductors.

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**4,713,508**

## CIRCUIT BREAKER OPERATING MECHANISM EQUIPPED WITH A STORED ENERGY SYSTEM HAVING REMOVABLE AND REPLACEABLE CLOSING SPRING MECHANISMS

**Pierre Baginski, Grenoble, and Jean-Pierre Nebon, St Martin-le-Vinoux, both of France, assignors to Merlin Gerin, Grenoble, France**

**Filed Oct. 16, 1986, Ser. No. 919,427**

**Claims priority, application France, Oct. 31, 1985, 85 16347**

**Int. Cl.[4] H01H *3/30***

**U.S. Cl. 200—153 SC** **7 Claims**

1. An operating mechanism of a high-rating multipole electrical circuit breaker, each pole having a pair of separable contacts including a movable contact actuated between a closed position and an opened position, said mechanism comprising:

a toggle device associated with a trip member and an opening spring for moving the movable contact towards the opened position, charging of the opening spring being carried out automatically when a closing operation is performed,

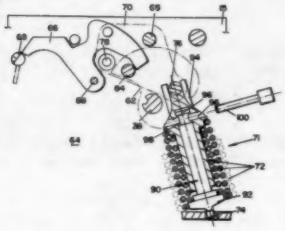
a stored energy system with an elastic device comprising at

least one closing spring arranged to move the movable contact to the closed position,

a rotatable recharging cam located in a charged position for charging said closing spring, and in a discharged position for allowing said closing spring to be decompressed,

a closing pawl cooperating with a latching bolt to lock the cam in the charged position, and to unlock the cam in the discharged position,

a kinematic transmission chain cooperating with said recharging cam and having a drive lever arranged between said stored energy system and the toggle device,



a telescopic link of said stored energy system having two parts with relative movement between which said closing spring is fitted,

a removable blocking device capable of locking said telescopic link when the two parts approach one another for the compression of said closing spring at the end of charging travel, and

a sub-assembly including said telescopic link and the compressed closing spring, which can be removed from the stored energy system upon release of said cam when the closing pawl is unlocked so as to cause a break in the kinematic transmission chain with the toggle device.

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**4,713,509**

## PALM SWITCH ACTUATOR AND LATCH

**Jerome E. Chebowski, Fremont, Ind., assignor to Rees, Inc., Fremont, Ind.**

**Filed Oct. 8, 1986, Ser. No. 916,899**
**Int. Cl.[4] H01H** *9/28*
**U.S. Cl. 200—328** **26 Claims**

**1.** An actuator-guard for palm switch comprising

a supporting frame having a mounting surface;

a hand-lever pivotally attached adjacent one edge thereof to said supporting frame;

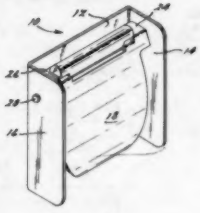
fixed stop means;

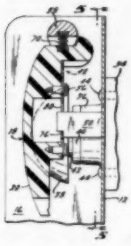
latch means carried by said hand-lever movable between stop-engaging and stop-disengaging positions whereby to be selectively engageable with and disengageable from said stop means;

actuator means coactive with said latch means operable to move the latter from said stop-engaging position to said stop-disengaging position,

said hand-lever being adapted to be manually pivotally actuated by placing the palm of the hand thereon with the fingers extending beyond said lever, and

said actuator means being disposed adjacent to said edge of said hand-lever for convenient actuation thereof and of said latch means to release said latch means from said stop means whereby to permit release of said latch means from said stop means and simultaneous pivotal actuation of said





hand-lever by a simple contractive movement of said fingers.

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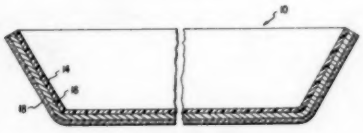
**4,713,510**

## PACKAGE FOR MICROWAVE COOKING WITH CONTROLLED THERMAL EFFECTS

**James R. Quick, Warwick; James W. Mitchell, Newburgh, and Dennis A. Cooley, Port Jervis, all of N.Y., assignors to International Paper Co., New York, N.Y.**

**Filed Jun. 25, 1986, Ser. No. 878,110**
**Int. Cl.[4] H05B** *6/64*
**U.S. Cl. 219—10.55 E** **17 Claims**



**1.** A microwave ovenable package that provides an intensified surface heating effect on a food product adapted to be placed in the package, a space within the package adapted to receive a food product, the package including at least one layer of a microwave energy-converting material and at least one layer of paperboard interposed between the layer of energy-converting material and the package space adapted to receive the food, whereby the energy-converting material converts a portion of microwave energy of the oven to heat, causing the transmission of thermal energy through the paperboard layer and to a food product adapted to be received in said space to thereby provide a surface heating effect on food adapted to be received in the space, the paperboard layer preventing any contact of the energy-converting material with a food product.

## 4,713,511
## CONTINUOUS SUBSTANTIALLY PLANAR MICROWAVE OVEN DOOR ASSEMBLY

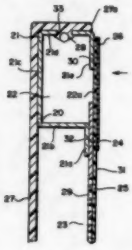
Hiroyuki Katoh, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 784,589, Oct. 4, 1985, abandoned. This application Mar. 23, 1987, Ser. No. 29,398

Claims priority, application Japan, Oct. 15, 1984, 59-155646[U]

Int. Cl.[4] H05B 6/76

U.S. Cl. 219—10.55 D 6 Claims



1. A substantially planar microwave oven door assembly, for sealing a heating chamber of a microwave oven, comprising:

a substantially planar door body comprising a flange forming a choke cavity, said flange surrounding a central opening in said door body, said flange having first, second and third wall portions, said second wall portion connecting said first and third wall portions with an opening into said choke cavity existing between said first wall portion and said second wall portion;

said first wall portion of said flange is located at an outer perimeter of said flange, said first wall portion being substantially planar and substantially parallel with one side of said second wall portion;

said third wall portion of said flange is located at an inner perimeter of said flange;

a substantially planar sealer plate operatively attached to said third wall portion with said sealer plate being located in the same plane as said first wall portion; and

a door film laminated to and substantially covering entirely said first flange portion, said sealer plate and said opening into said choke cavity for providing a first side of the microwave oven door assembly with a continuous substantially planar surface.

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## 4,713,512
## MICROWAVE STABLE TABLEWARE

Wolfgang Wild; Joachim Straub, and Günter Landgraf, all of Hanau, Fed. Rep. of Germany, assignors to W. C. Heraeus GmbH, Hanau, Fed. Rep. of Germany

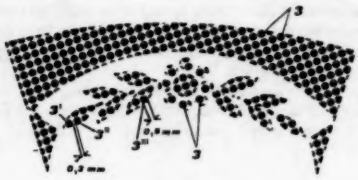
Filed Aug. 18, 1986, Ser. No. 897,772

Claims priority, application Fed. Rep. of Germany, May 6, 1986, 3615272

Int. Cl.[4] H05B 6/80

U.S. Cl. 219—10.55 E 13 Claims

1. Microwave stable tableware comprising a body made of siliceous material and having applied thereto a precious metal decoration of a plurality of markings, wherein said markings are separated by a distance of at least 0.2 mm from each other and the maximum extension of each of said markings is about 5



mm, wherein said decorated tableware can be exposed to a microwave field without destructive arcing.

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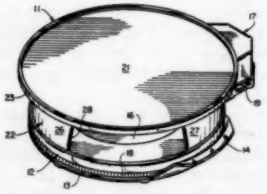
## 4,713,513
## MICROWAVE OVEN TURNTABLE SHELF STRUCTURE

Albert E. Colato, Woodbury, Minn., assignor to Plastics, Inc., Minneapolis, Minn.

Division of Ser. No. 47,016, Jun. 11, 1979, Pat. No. 4,593,171. This application Jun. 2, 1986, Ser. No. 869,599

Int. Cl.[4] H05B 6/78

U.S. Cl. 219—10.55 F 2 Claims



1. In apparatus for use in cooking food products in a microwave oven: a portable turntable having a base adapted to rest on a supporting surface in the oven cavity, a table rotatively mounted on the base, and a drive motor for rotating the table about a vertically extending axis, said turntable being adapted to be freely inserted into and removed from the cavity of the microwave oven, and a shelf structure removably mounted on the turntable having a horizontally extending platform for receiving a first food product and a plurality of legs depending from the platform and adapted to rest on the table of the turntable with the platform being spaced above the table by a distance great enough to permit a second food product to be heated on the table beneath the platform and the legs being spaced apart with an opening between two of the legs large enough to permit the second food product to be placed on and removed from the table without removing the shelf structure from the turntable.

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## 4,713,514
## MICROWAVE OVEN HAVING CONTROL MEANS WHICH REDUCE THE RISK OF NO-LOAD OPERATION

Jean-Pierre Hazan, Sucy-en-Brie, and Michel Steers, La Queue-en-Brie, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 16, 1986, Ser. No. 919,909

Claims priority, application France, Feb. 28, 1986, 86 02821

Int. Cl.[4] H05B 6/68

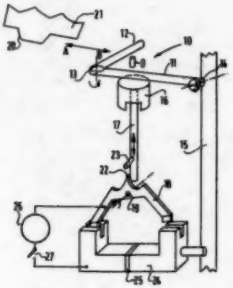
U.S. Cl. 219—10.55 B 4 Claims

1. A microwave oven safety control comprising:

an oven door operated cam member, said cam member being displaced in a first direction during opening of said oven door, and in a second opposite direction during closing of said door;

a first pivot arm having one end connected to a rigid base about a pivot connection which permits said first arm to pivot in a vertical direction and which is biased upwardly by a spring;

a second pivot arm located in the path of said cam member connected through a second pivot connection to a remaining end of said first pivot arm, said second pivot arm being pivoted in said first and second directions and being restrained from pivoting by a stop when said cam member moves in said first direction, forcing said first and second pivot arms downward about said first pivot connection, said second pivot arm being pivoted away from said stop



when said cam member moves in said second direction, permitting said first and second arms to move upwardly; and

a pendant type electrical switch having a linear actuation member which changes the state of said switch between a closed and open, and open and closed state only when it is moved in a downward direction, said linear actuating member being positioned under said first arm for actuation each time said first arm moves downwardly, whereby said electrical switching state changes from a closed state to an open state and then back to a closed state when said door is opened two consecutive times.

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**4,713,515**

## ELECTRODE HOLDER FOR ELECTRIC DISCHARGE PROCESSING MACHINES

**Jung W. Choi, 96-3 Saitobuncho, Kanagawa-ku, Yokohama-shi, Kanagawa 221, Japan**

**PCT No. PCT/JP86/00179, § 371 Date Nov. 19, 1986, § 102(e) Date Nov. 19, 1986, PCT Pub. No. WO86/06014, PCT Pub. Date Oct. 23, 1986**

**PCT Filed Apr. 11, 1986, Ser. No. 932,697**

**Claims priority, application Japan, Apr. 12, 1985, 60-053662[U]**

**Int. Cl.⁴ B23H *7/26***

**U.S. Cl. 219—69 E** **4 Claims**

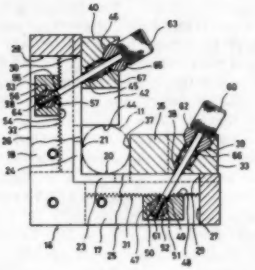
1. An electrode holder for electric spark machine comprising:

an L-shaped base block consisting of a first arm and a second arm extending perpendicular and continuous to each other, the inside faces of said first and second arms serving as reference plane for the abutment againt a working electrode to be set, in which a recession is formed in the outside face, along a length thereof, of each of said first and second arms and an elongated slot is formed along the central part of said recession, the bottom of said recession being serrated at a constant small pitch to constitute an engaging portion;

a first clamping member arranged slidable on the inside face of said first arm of said base block, said clamping member having a protuberant portion and cut-out portions at the inside end thereof, said protuberant portion rising up vertically from said reference plane of said first arm so that the end face of said protuberant portion serves as a plane of abutment against the electrode, said first clamping member being also formed with a hole for passing a clamping screw, said hole extending aslant from the outer end of said clamping member through the central portion thereof and connecting to said elongated slot of said first arm;

a second clamping member arranged slidable on the inside face of said second arm of said base block, said second clamping member having at its inside end a cut-out portion and protuberant portions designed to fit with the corresponding protuberant portion and cut-out portions of said first clamping member, said protuberant portions of said second clamping member rising up vertically from said reference plane of said second arm so that the end faces of said protuberant portions serve as a plane of abutment against the electrode, said second clamping member being also formed with a hole for passing a clamping screw, said hole extending aslant from the outer end of said clamping member through the central portion thereof and connecting to said elongated slot of said second arm;

a first engaging member having an engaging face serrated at



a constant small pitch and designed to engage with the corresponding engaging portion of said first arm of said base block, said first engaging member being disposed movably in said recession of said first arm;

a second engaging member having an engaging face serrated at a constant small pitch and designed to engage with the corresponding engaging portion of said second arm of said base block, said second engaging member being disposed movably in said recession of said second arm;

a first clamping screw loosely passed through said hole of said first clamping member and through said elongated slot of said first arm of said base block, with the threaded end of said clamping screw being screwed into said first engaging member to secure said first clamping member and said first engaging member to said first arm of said base block; and

a second clamping screw loosely passed through said hole of said second clamping member and through said elongated slot of said second arm of said base block, with the threaded end of said clamping screw being screwed into said second engaging member to secure said second clamping member and said second engaging member to said second arm of said base block.

## 4,713,516
## PULSE GENERATOR FOR SPARK EROSIVE METAL WORKING

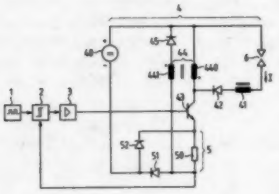
**Ernst Bühler, Losone, and Antonio Rullo, Giubiasco, both of Switzerland, assignors to AG fur industrielle Elektronik AGIE Losone b. Locarno, Losone, Switzerland**

**Filed May 10, 1985, Ser. No. 733,002**

**Claims priority, application Switzerland, May 11, 1984, 2354/84**

**Int. Cl.[4] B23H *7/14*; G05F *1/44***

**U.S. Cl. 219—69 P** **15 Claims**



**1.** In a spark erosion plant for the machining of a conductive workpiece by a tool electrode, a pulse generator comprising a voltage source for supplying electrical power to the spark gap formed between the workpiece and the tool electrode; a transformer having at least two windings with a first winding and a second winding being connected in parallel with the voltage source as a recuperation transformer, a first end of the first winding and a first side of the spark gap being operatively connected to a first terminal of the voltage source and a second end of the first winding being operatively connected to a second side of the spark gap through an inductor element, the second end of the first winding being further connected to a second terminal of the voltage source through a controllable switching element having a conductive state and a nonconductive state; a unidirectional current conducting element connected in series with the second winding to permit a recuperation current flow from the second winding to the positive terminal of the voltage source; and a drive means connected to the switching element for selectively placing the switching element in the conductive state, so that current can flow from the voltage source through the spark gap, the inductor element, and the switching element when the switching element is in the conductive state and, when the switching element is turned off, current continues to flow through the spark gap by way of the first winding of the recuperation transformer, the latter current being due to the energy stored in the inductor element during the time that the switching element is conductive and causing a recuperation current to flow through the voltage source from the second winding of the recuperation transformer.

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## 4,713,517
## CUT CONTOUR DISPLAY METHOD IN WIRE ELECTRIC DISCHARGE MACHINE

**Mitsuo Kinoshita, Tokyo, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan**

**PCT No. PCT/JP85/00169, § 371 Date Dec. 4, 1985, § 102(e) Date Dec. 4, 1985, PCT Pub. No. WO85/04610, PCT Pub. Date Oct. 24, 1985**

**PCT Filed Apr. 5, 1985, Ser. No. 807,038**

**Claims priority, application Japan, Apr. 7, 1984, 59-69693**

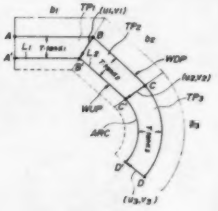
**Int. Cl.[4] B23H *7/06*; G05B *19/415***

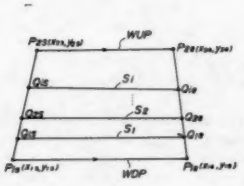
**U.S. Cl. 219—69 W** **4 Claims**

**1.** A cut contour display method in a wire electric discharge machine for subjecting a workpiece to taper cutting by moving a workpiece relative to a wire electrode and moving a wire tensioning guide horizonally, comprising the steps of:

(a) entering path data for a plurality of blocks defining a programmed path lying on an upper or lower surface of the workpiece, workpiece thickness I, data consisting of a taper angle $\alpha_1$ in each block or vector $(u_i, v_i)$ indicative of a positional offset between the upper and lower surfaces of the workpiece at the ends of the block, and data specifying a number of cross sections parallel to the lower surface of the workpiece and cutting a taper-cut surface;

(b) obtaining a wire electrode path on whichever one of the upper and lower surfaces of the workpiece does not have the programmed path lying thereon by using the programme path, workpiece thickness T, taper angle $\alpha_i$ or vector $(u_i, v_i)$ indicative of the positional offset between the upper and lower surfaces of the workpiece at the end of the block;





(c) obtaining coordinate values of points on each cross-sectional contour at an end portio of each block by using data indicative of the wire electrode paths on the upper and lower surfaces of the workpiece and the number of cross section; and

(d) displaying, on a display unit, the wire electrode paths on the upper and lower surfaces of the workpiece as well as each cross-sectional contour of the taper-cut surface, by using the data indicative of the wire electrode paths on the upper and lower surfaces of the workpiece and coordinate values of the points on each cross-sectional contour at the end portion of each block.

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## 4,713,518
## ELECTRONIC DEVICE MANUFACTURING METHODS

**Shunpei Yamazaki; Kenji Itoh, and Susumu Nagayama, all of Tokyo, Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Japan**

**Filed Jun. 3, 1985, Ser. No. 740,764**

**Claims priority, application Japan, Jun. 8, 1984, 59-117538; Oct. 8, 1984, 59-211769**

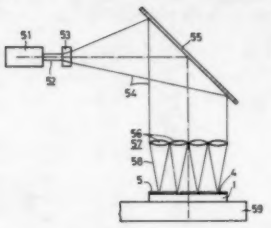
**Int. Cl.[4] B23K *26/00***

**U.S. Cl. 219—121 LM** **14 Claims**

**1.** A method for the manufacture of an electronic device which is provided with at least a transparent conductive layer, comprising the steps of:

forming a transparent conductive layer on a transparent substrate having a surface of an insulator selected from the group consisting of organic and inorganic insulators, or on a non-single-crystal semi-conductor layer member, wherein the transparent conductive layer member has a thickness of two μm or less and consists principally of a sublimable metallic compound selected from the group consisting of oxides and nitrides, and wherein the non-single-crystal semi-conductor layer member consists princi-

pally of a sublimable semi-conductor which includes a dangling bond neutralizer selected from the group consisting of hydrogen and halogen; and exposing the transparent conductive layer member to irradiation by one or more pulsed laser beams which are squeezed in only one direction after expansion in cross-section and have a




wavelength of 400 nm or less and optical energy greater than the optical energy band gap of the transparent conductive layer member, thereby forming the transparent conductive layer which has a thickness of 2 μm or less and consists principally of the sublimable metallic oxide or nitride on the substrate or the non-single-crystal semi-conductor layer member.

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**4,713,519**

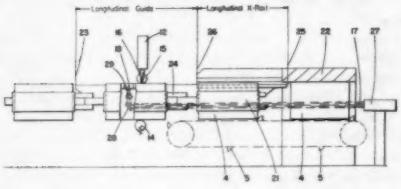
## APPARATUS FOR LASER BEAM WELDING THE LONGITUDINAL EDGES OF A CAN

**Bernhard Bersch; Heinz Jüttner, and Ulrich Tenhaven, all of Dortmund, Fed. Rep. of Germany, assignors to Hoesch Aktiengesellschaft, Fed. Rep. of Germany**

**Continuation of Ser. No. 767,765, Aug. 21, 1985, abandoned. This application Oct. 6, 1986, Ser. No. 915,862**

**Int. Cl.[4] B23K** *26/00*

**U.S. Cl. 219—121 LC** **7 Claims**




1. An apparatus for producing welded can bodies from rectangular pieces of sheet material, said apparatus comprising a forming station means having a cylindrically shaped inner space surrounding a given axis and into which space rectangular pieces of sheet material may be successively fed in a direction tangentially of said inner space to bend each piece into a cylindrical shape, said forming station means having a first open end located at one point along said given axis and a second open end spaced downstream along said given axis from said first end, welding means providing a welding station located downstream along said given axis from said forming station, and means for moving each piece of sheet material after it is bent into a cylindrical shape by said forming station means downstream along said given axis from said forming station means to and past said welding station and for guiding such piece of material during such movement, said moving and guiding means being such that said cylindrical shape of each bent piece of material is maintained as it is moved from said forming station means to said welding station and such that the longitudinal edges of the piece are abutted at said welding station, said moving and guiding means further being such that a substantial portion of the inside cross-section of each bent piece of sheet material is empty throughout its passage from said forming station means to said welding station so that an empty path extends parallel to said given axis from a point upstream of said first end of said forming station means to said welding station, said welding means including an outside welding means for directing a first laser welding beam onto the outside of a bent piece of sheet material at said welding station at a first point intersecting the abutting longitudinal edges of said piece to weld said abutting edges to one another as they are moved past said welding station, and an inside welding means for directing a second laser welding beam onto the inside of a bent piece of sheet material at said welding station at a second point intersecting the abutting longitudinal edges of said piece to also weld said abutting edges to one another as they are moved past said welding station, said inside welding means including a means for directing said second laser welding beam so that it passes through said point located upstream of said first open end of said forming station means and from said point travels parallel to said given axis along said empty path to said welding station, a mirror at the downstream end of said empty path for reflecting said second welding beam toward the inside surface of a bent piece of sheet material at said welding station, and a concentrating lens between said mirror and said inside surface of a bent piece of sheet material for concentrating said second beam onto said second point intersecting said abutting longitudinal edges of said bent piece of sheet material, each of said first and second welding beams having such an energy level that each of said beams welds less then the entire thickness of each piece of bent sheet material as such piece is moved past said welding station.

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**4,713,520**

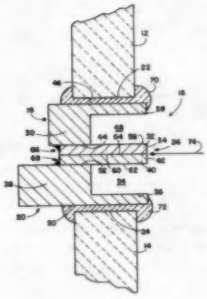
## METHOD AND APPARATUS FOR INTERCONNECTING AND HERMETICALLY SEALING CERAMIC COMPONENTS

**H. Lee Van Nice, Hillsboro; Myron A. Bostwick, Jr., Banks, and Keith F. Kongslie, Beaverton, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.**

**Filed Mar. 24, 1986, Ser. No. 843,488**

**Int. Cl.[4] B23K** *26/00*

**U.S. Cl. 219—121 LC** **12 Claims**



1. In a hollow enclosure that includes a first ceramic wall section having a first annular edge and a second ceramic wall section having a second annular edge, compact coupling means for interconnecting the first and second edges and providing a hermetic seal between them, said coupling means comprising;

first and second annular coupling assemblies each including a first flange portion, a web portion and a second flange portion with an outer edge, the first flange portion of the first coupling assembly being fritted to the first annular edge of the first wall section, the first flange portion of the second coupling assembly being fritted to the second annular edge of the second wall section, and the outer edge of the second flange portion of the first coupling assembly being laser welded to the outer edge of the

second flange portion of the second coupling assembly, the thermal path from the laser weld through the second flange portion and web portion to the fritted connection of each coupling assembly being sized such that the coupling assemblies sufficiently attenuate a thermal shock wave generated during laser welding and sufficiently retard heat conduction from the location of the weld to the frit connections to maintain the frit connections intact during laser welding, the thermal path being substantially no longer than necessary to retard such heat conduction.

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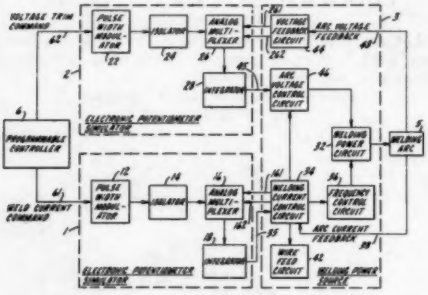
**4,713,521**

## ELECTRONIC POTENTIOMETER SIMULATOR

**Richard A. Eldridge, Chicago Ridge, Ill., assignor to ESAB Welding Products, Inc., Chicago, Ill.**

**Filed Nov. 16, 1984, Ser. No. 672,545**
**Int. Cl.[4] B23K *9/10***
**U.S. Cl. 219—130.5** **1 Claim**




1. Apparatus for providing an output control signal having a characteristic value variable between high and low limits represented by applied first and second respective limit signals comprising:

means responsive to a variable analog input control signal for producing an intermediate digital pulse width modulated signal having a variable duty cycle which corresponds to and is produced as a function of variations in said analog input control signal;

means for isolating said intermediate pulse width modulated signal from said analog input control signal to effecuate direct current isolation of said output control signal from said input control signal;

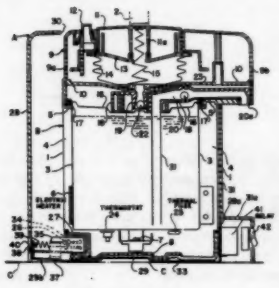
an analog multiplexer with first and second inputs for receiving said first and second applied respective limit signals with a control input coupled to said isolated pulse width modulated signal with said applied first or said applied second limit signal switched to an output line of said multiplexer in response to said isolated pulse width modulated signal; and integrated means, coupled to said output line of said analog multiplexer, for time-averaging said switched signal on said output line to form said output control signal.

**4,713,522**

## ELECTRIC HEATING APPLIANCE DETACHABLY MOUNTED IN A MOTOR VEHICLE

**Shinichi Kimura, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 706,834, Feb. 28, 1985, abandoned. This application Oct. 10, 1986, Ser. No. 917,803**
**Claims priority, application Japan, Feb. 28, 1984, 59-28789[U]; Feb. 28, 1984, 59-28790[U]; Feb. 28, 1984, 59-2879[U]**
**Int. Cl.[4] H05B *1/02, 3/00;* A47J *27/00;* F24H *1/22***
**U.S. Cl. 219—202** **2 Claims**



1. A heating unit detachably mountable in a motor vehicle and comprising

an outer casing adapted to be fixedly secured on a portion of a vehicle,

an electric heating appliance adapted to be removably supported in the outer casing,

said outer casing having a recessed portion for removably receiving said heating appliance,

said heating appliance having therein an electric heating element and a temperature sensor capable of producing switching signals indicative of heating appliance temperature,

a first electrical connector adapted to be connected to a power supply of the vehicle, said first electrical connector being on said outer casing,

a second electrical connector carried by said heating appliance,

said first and second electrical connectors being arranged to detachably mate with each other when said heating appliance is seated within said recessed portion of said outer casing,

a power control switch and means for actuating said power control switch in response to the switching signals produced by said temperature sensor in said heating appliance,

said power control switch and said switch actuating means being located in said outer casing at a location remote and shielded from said heating element of said heating appliance when said heating appliance is seated in said recessed portion of said outer casing,

said power control switch of said outer casing and said heating element of said heating appliance being connected in series with each other in a power supply circuit through said first connector of said outer casing and said second connector of said heating appliance,

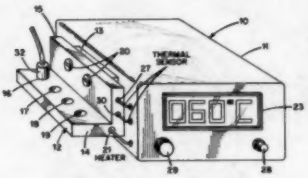
said temperature sensor of said heating appliance and said switch actuating means being connected in series with each other through said first and second connectors in a control circuit in parallel with said power supply circuit, and

said outer casing only partially enclosing said heating appliance when said heating appliance is seated in said recessed portion of said outer casing so as to permit use of said heating appliance while so seated in said outer casing.

## 4,713,523
## FIBER OPTIC CONNECTOR EPOXY CURING APPARATUS

**Donald C. MacDonald, Holbrook, Mass., assignor to GTE Government Systems Corporation, Waltham, Mass.**

**Filed Sep. 2, 1986, Ser. No. 902,550**
**Int. Cl.[4] H05B** *3/06*
**U.S. Cl. 219—385** **1 Claim**

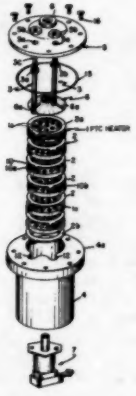



1. Apparatus for heat curing a plurality of fiber optic connectors, comprised of:
- a housing;
- a heater control circuit within said housing having a thermal sensor input and a heater output;
- a metal jig having a plurality of holes for receiving fiber optic connectors;
- a first thermal sensor in thermal communication with said jig and electrical connector with said thermal sensing input of said heat control circuit;
- a thermally and electrically insulating stand off member interposed between said jig and said housing;
- a heater in thermal communication with said jig and in electrical communication with said heater output of said heater control circuit; and
- mounting means for attaching said jig to an external surface of said housing, wherein said jig has a horizontal leg having said holes, and a vertical leg coupled to said mounting means, and wherein said heater is located at the junction of said legs.

## 4,713,524
## PTC FUEL HEATER FOR HEATING ALCOHOL FUEL

**Vincent B. Leo, Raymond; Kenneth M. Cyll, W. Buxton, and Mason G. Ide, Gorham, all of Me., assignors to GTE Products Corporation, Stamford, Conn.**

**Filed Apr. 21, 1986, Ser. No. 855,547**
**Int. Cl.[4] H05B** *3/82;* **F24H** *1/10;* **F02M** *31/12*
**U.S. Cl. 219—307** **5 Claims**

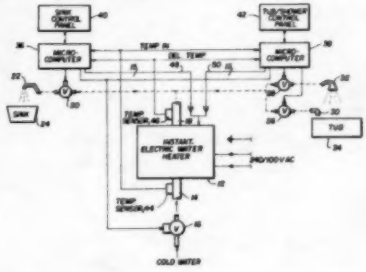



1. A fuel heater comprising:
- a container having an electrically insulated interior defining a fuel flow path and further having an inlet and an outlet, being connected to the opposite ends of said flow path for the passage of fuel therethrough; and
- a stack of generally planar foraminous PTC heaters disposed in said container in the flow path between the inlet and the outlet and arranged transversely of the flow direction of the flow of fuel; and
- an array of flat ring-like conductive elements, each having an electrical contact projecting from an edge thereof, the contact means of said array of elements being arranged in two rows, the electrical contact means in one row being arranged so as to be radially offset from the electrical contact means of the other row, each conductive element of each row being disposed between alternate PTC heaters in said stack, each of said conductive elements engaging substantially only the perimeter of the PTC heaters to leave the foraminous central portion thereof unobstructed to allow flow of fuel through said stack of PTC heaters from said inlet to said outlet; and
- a pair of radially offset channels disposed on the interior of said container; and
- electrical contact means of one row being disposed in one of said channels and electrical contact means of the other row being disposed in the other of said channels; and
- means connecting the outsides of the opposite end-most PTC heaters in the stack to the opposite sides of a power supply and means connecting the electrical contact means of said one row and the electrical contact means of said other row to opposite sides of the same power supply.

## 4,713,525
## MICROCOMPUTER CONTROLLED INSTANT ELECTRIC WATER HEATING AND DELIVERY SYSTEM

**Calvin W. Eastep, Houston, Tex., assignor to Kowah, Inc., Houston, Tex.**

**Filed Jul. 23, 1986, Ser. No. 888,400**
**Int. Cl.[4] H05B** *1/02;* **F24H** *1/10;* **G05D** *23/00*
**U.S. Cl. 219—308** **6 Claims**




1. A computer controlled electric instant water heating system comprising:
- an electric water heater having water inlet and outlet means and including a first plurality of separately energizable electric resistive heating elements located therein for raising the temperature in discrete equal first valued temperature increments, a second plurality of separately energizable resistive heating elements for raising the temperature in discrete equal second valued temperature increments, and at least one other separately energizable resistive heating element for raising the temperature a discrete third valued temperature increment, said first valued increments being greater than said second valued increments and said third valued temperature increment being less than said second valued increments;
- at least one variable rate delivery valve connected to said outlet means for delivering water at a selected flow rate to a water tap;
- first and second means for respectively sensing the ambient

inlet water temperature at said inlet means and the delivery water temperature at said outlet means;

means for selecting a desired delivery water flow rate at said water tap;

means for selecting a desired delivery water temperature at said water tap; and

digital computer means including means responsive to said temperature selecting means and programmed to constantly calculate the difference between the ambient inlet water temperature and the delivery water temperature, means responsive to said calculated temperature difference for electrically energizing at least one of said heating elements to bring the delivery water temperature to the selected delivery temperature, means for controlling display means to display the current delivery temperature, and means responsive to said flow rate selecting means for controlling said variable rate delivery valve to deliver water at the selected delivery rate to said water tap,

said digital computer means being further programmed to permit water delivery to said water tap only under a predetermined valid set of user selected flow and temperature values and including means responsive to an invalid selection for causing system operation to occur at the closest possible allowable conditions of flow rate and temperature.

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**4,713,526**

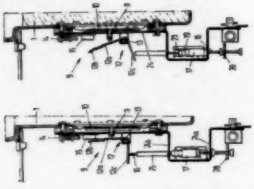
## RESERVOIR FILLING ARRANGEMENT FOR A COFFEE MACHINE

**Gerard C. Smit, Amerongen, Netherlands, assignor to Smitdesign B.V., Amerongen, Netherlands**

**Filed Sep. 22, 1986, Ser. No. 909,682**

**Int. Cl.[4] A47J *31/00*; H05B *1/00*; F24H *1/00***

**U.S. Cl. 219—332** **15 Claims**



**1.** A valve control device for a coffee machine of the type including water supply conduit coupled thereto and a valve for controlling flow therein, the reservoir having a wall, said valve control device comprising a diaphragm capable of being disposed in said wall, stud means operably coupled to said diaphragm for movement thereby, a tilting member arranged proximate said stud means, a control circuit for operating the valve and bistable switch means in said control circuit, means mounting said tilting member for swivelling movement about a swivel axis between first and second positions, said first position being in the path of movement of said stud means and said second position operably coupled to said switch means and magnetic means for retaining said tilting member in said first position until overcome by movement of said stud means enabling movement of said tilting member to said second position.

**4,713,527**

## RADIANT HEATING UNIT

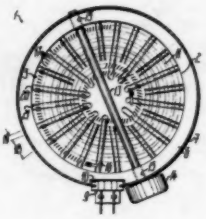
**Robert Kicherer; Felix Schreder, and Leonhard Dörner, all of Oberderdingen, Fed. Rep. of Germany, assignors to EGO Elektro Geräte Blanc u. Fischer, Fed. Rep. of Germany**

**Filed May 28, 1986, Ser. No. 868,260**

**Claims priority, application Fed. Rep. of Germany, May 30, 1985, 3519350**

**Int. Cl.[4] H05B *3/68, 3/18***

**U.S. Cl. 219—464** **24 Claims**



**1.** A radiant heating unit, comprising:

an insulating support made from high temperature-resistant formed insulating material, at least one radiant heating resistor held in said insulating support, wherein the insulating support substantially comprises a granulation of an expanded mica, compressed with a binder.

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**4,713,528**

## COOKING APPARATUS WITH TIMER

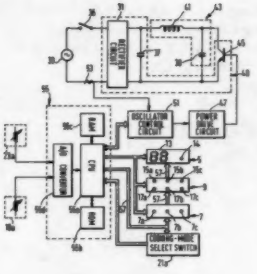
**Hidetoshi Hirata, Nagoya, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Oct. 18, 1985, Ser. No. 788,872**

**Claims priority, application Japan, Nov. 9, 1984, 59-235190**

**Int. Cl.[4] H05B *1/02***

**U.S. Cl. 219—492** **7 Claims**



**1.** A cooking apparatus comprising:

setting position means, including a variable resistor, for establishing a variable desired value based on a setting position thereof and producing an variable output signal corresponding to said desired valve when said setting position is within a predetermined range, and producing an output signal representing no desired valve when said setting position is outside said predetermined range;

timer means for counting until achieving a value indicated by said output signal of said setting position means;

means for detecting whether said timer means is operative based on said output of said setting position means;

means for cooking until said timer means counts to said desired value; and

means for continuing said cooking indefinitely if said timer means is rendered inoperative by said output signal repre-

senting no desired value, before reaching said desired value.

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4,713,529

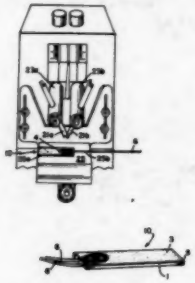
## ELECTROCERAMIC HEATING DEVICES WITH WELDED LEADS

**Lionel J. Melanson, Casco, and Richard C. Watson, Sebago Lake, both of Me., assignors to GTE Products Corporation, Stamford, Conn.**

**Filed Sep. 15, 1986, Ser. No. 906,875**

**Int. Cl.[4] H05B *3/44;* H01C *1/144;* B05D *5/12***

**U.S. Cl. 219—541** **7 Claims**



1. An electroceramic heater comprising:

a pair of metallic coatings forming metallic electrodes, electrically insulated from each other and a body of electroceramic material disposed therebetween, said body being capable of prodcing heat upon application of current to electrodes; and

a lead wire extending outwardly from each of the metallic electrodes; and

pads comprising a layer of copper metal disposed between each lead wire and the respective metallic electrode; and

said lead wires being welded to each of the respective electrodes by means of said pad, each of said lead wires having at least two impressions formed thereon, and said weld being formed between said impressions and between respective pad and lead wire.

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4,713,530

## HEATING ELEMENT COMBINED GLASS/ENAMEL OVERCOAT

**Hans-Joachim Schittenhelm, Leverkusen; Werner Joseph, Cologne, and Gerhard Trögel, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Sep. 26, 1986, Ser. No. 912,446**

**Claims priority, application Fed. Rep. of Germany, Oct. 11, 1985, 3536268**

**Int. Cl.[4] H05B *3/16;* H01C *1/012;* B05D *1/36***

**U.S. Cl. 219—543** **7 Claims**

1. A panel heating element comprising (a) a metal substrate, (b) an aluminum boron-silicate insulating glass which forms a coating on the metal substrate, (c) one or more metallic resistance tracks applied to the substrate and (d) a mixture of a zirconium phosphate glass and a boron-titanium enamel which is applied as a layer over the metallic resistance tracks.

4,713,531

## HEATING ELEMENT FOR TEXTILES

**Peter Fennekels; Ernst Waltmann, both of Krefeld, and Walter Schumacher, Nettetal, all of Fed. Rep. of Germany, assignors to Girmes-Werke AG, Fed. Rep. of Germany**

**Filed Jul. 30, 1984, Ser. No. 635,427**

**Int. Cl.[4] H05B *3/34;* H01C *3/06***

**U.S. Cl. 219—545** **19 Claims**

1. A heating element for textiles comprising:

(a) a plane textile element,

(b) metallic conductors combined with said plate textile element and having metallic fibers and with a denier of natural or synthetic textile fibers and an average cross-section thickness of about 8 to 24 microns,

(c) said metallic conductors being resistance elements in that they are connectable to a source of electrical current and oppose electrical current flowing through them with a heat-producing resistance,

(d) said conductors being provided with an electrically-insulating sheath,

(e) said fibers behaving like textile fibers and therefore not noticeably changing the natural behavior of the textiles and withstanding crushing and bending stresses.

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4,713,532

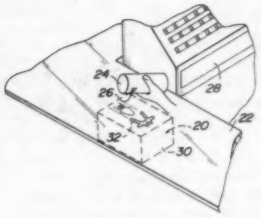
## COMPACT OMNIDIRECTIONAL LASER SCANNER

**Carl H. Knowles, Moorestown, N.J., assignor to Metrologic Instruments, Inc., Bellmawr, N.J.**

**Filed Nov. 21, 1985, Ser. No. 800,486**

**Int. Cl.[4] G06K *7/10***

**U.S. Cl. 235—467** **14 Claims**



1. A compact laser scanner for use at a counter to produce a scanning pattern thereabove and into which a bar code can be inserted to enable the reading of said code, said scanner comprising a housing of a height no greater than approximately six inches (15.2 cm) and taking up only a small area of said counter, said housing having a horizontal longitudinal axis, a horizontal transverse axis, a vertical axis, and a top including a generally horizontally disposed light transmissive opening, said scanner comprising laser beam generating means for producing a laser beam, beam sweeping means for cyclically sweeping said beam in said housing, and reflecting means comprising first, second and third portions, all of said means being located within said housing, said beam sweeping means and said reflecting means being oriented so that for each sweep of said beam in said housing said reflecting means projects a scanning pattern out of said light transmissive opening, said scanning pattern comprising three scan lines, said lines being a transverse line extending perpendicularly to said longitudinal axis, and a pair of side lines each extending at an angle to the transversee line and to each other, said first portion of said reflecting means comprising a first reflecting surface extending

generally perpendicularly to said longitudinal axis to produce said transverse line of said pattern, said second portion of said reflecting means comprising a second reflecting surface disposed generally to one side of said first reflecting surface, said third portion of said reflecting means comprising a third reflecting surface disposed generally to the other side of said first reflecting surface, each of said second and third reflecting surfaces having a longitudinal axis extending in a generally upward direction at a shallow angle to said vertical axis and taking up a substantial portion of the height of said housing, said beam sweeping means and said reflecting means being arranged so that said beam inpinges said second and third reflecting surfaces adjacent the lower end of each from a generally horizontal direction and sweeps along said second and third reflecting surfaces in an upward direction generally parallel to said longitudinal axis thereof to a point adjacent the top thereof to produce said two side lines of said pattern.

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**4,713,533**

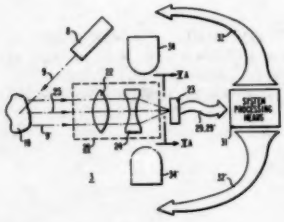
## CONCENTRIC DETECTOR ARRAY AND ASSOCIATED HYBRID SIGNAL PROCESSING FOR COARSE AND FINE ELECTRO-OPTICAL TRACKING

**James C. Bremer, Gaithersburg; Fred S. Hurt, Ellicott City; John G. Romanski, Annapolis; Richard F. Kroupa, Pasadena, and Ronald G. Kraus, Severna Park, all of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jan. 3, 1986, Ser. No. 816,097**

**Int. Cl.[4] G01J *1/20***

**U.S. Cl. 250—203 R** **18 Claims**



1. A passive electro-optic tracking system for measuring the angular displacement of a target relative to the tracking system boresight comprising:

a wide field of view optical detector means disposed along the boresight of said system further comprising a central fine track detector array portion of at least four quadrants and at least one concentric ring of coarse track detector elements about said central quadrant array portion, all of said fine track quadrants and coarse track elements operable to simultaneously receive optical energy emitted from said target and further operable to convert said received emitted optical energy into electrical energy;

a signal threshold processor means comprising a coarse track signal processing means coupled to said coarse track detector elements, said processor means operable to analyze said electrical energy generated from said emitted optical energy from said target and further comprising a fine track signal processing means coupled to said central fine track quadrant array portion said fine track signal processing means operable to analyze said electrical energy produced from said optical energy striking said fine track quadrant array portion;

a receiver telescope means positioned on a common colinear axis with said optical detector means, said telescope means operable to receive said optical energy emitted from said target and further operable to direct said optical energy towards said optical detector means;

a two axis gimbal pointing system interconnected to said receiver telescope means comprising a multiplicity of motor drives, said two axis system operable to reposition said receiver telescope means in relation to said target means;

a command generator means interconnected between said fine track and said coarse track signal processing systems and said two axis gimbal pointing system, said command generator means operable to issue commands to said gimbal pointing system to reposition said receiver telescope means relative to said target means during said tracking system operation.

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**4,713,534**

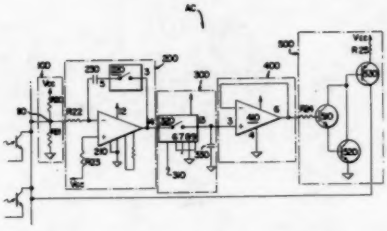
## PHOTOTRANSISTOR APPARATUS WITH CURRENT INJECTION AMBIENT COMPENSATION

**Timothy E. Masters, Georgetown, and Wayne J. Wehrer, Austin, both of Tex., assignors to Carroll Touch Inc., Round Rock, Tex.**

**Filed Feb. 18, 1986, Ser. No. 830,408**

**Int. Cl.[4] H01J *40/14***

**U.S. Cl. 250—214 B** **9 Claims**



2. A phototransistor signal detection circuit for measuring the intensity of an incident light signal having an ambient compensation network for maintaining the output level of an ambient induced signal from a phototransistor wherein the signal detection gain can remain large while remaining within the operating range for varying ambient conditions; the detection circuit comprising:

a first voltage source;

voltage divider means connected to the first voltage source for establishing a voltage at the phototransistor collector dependent upon the phototransistor collector to emitter current upon excitation of the phototransistor;

means for measuring an ambient signal corresponding to the voltage at the phototransistor collector under ambient conditions;

means for sampling and holding the ambient signal upon excitation of the phototransistor by the incident radiation signal; and

current injection means responsive to the ambient signal for injecting a current at the phototransistor collector to offset incremental changes in the phototransistor collector voltage induced by ambient excitation of the phototransistor.

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**4,713,535**

## OPTICAL KEYBOARD

**Randy L. Rhoades, 1947 Delaware Ave., Swissvale, Pa. 15218**

**Filed Sep. 4, 1985, Ser. No. 772,553**

**Int. Cl.[4] H01J *40/14*; G06F *15/40***

**U.S. Cl. 250—221** **15 Claims**

1. Interface apparatus for a data processor comprising,

a data entry terminal including an array of photosensors,

a monitor for visually displaying data, said monitor associated with said data entry terminal,

said photosensors being positioned in a X-Y coordinate system having a plurality of rows of photosensors parallel with a X-axis and a plurality of columns of photosensors parallel with a Y-axis for identifying each photosensor by a X and Y coordinate,

said photosensors being actuated or not actuated between an active state and an inactive state in dependence upon receipt of energy from a source of energy to generate input signals,

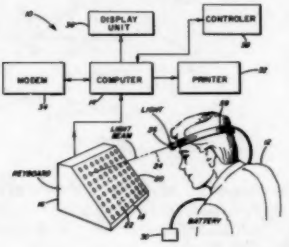
a microprocessor board having a data input terminal,

data input lines electrically connecting said data input terminal in a first network to all of said sensors in said X-axis and in a second network to all of said photosensors in said Y-axis,

said data input terminal on said microprocessor board receiving input signals from said photosensors upon receipt of energy representing a selected X and Y coordinate in said array of photosensors,

data processing means for receiving output signals from said microprocessor board in response to said input signals from said actuated sensors as instructions to perform a task,

means associated with said data processing means for transmitting data commands through said microprocessor board for display on said monitor,




bidirectional data means connecting said data entry terminal, said microprocessor board, and said data processing means for simultaneous transfer of data between said data entry terminal and said data processing means,

means on said microprocessor board for sensing said input signals from said array of photosensors sequentially row by row parallel to said X-axis to identify said photosensors aligned with said Y-axis being actuated,

said microprocessor board including an output terminal connected to said data processing means for transmitting said output signals representing each actuated photosensor by X and Y coordinates to said data processing means, and

said data processing means in response to said output signals from said microprocessor board being operable to perform said task in response to actuation of said photosensors when exposed to a source of energy.

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**4,713,536**

## MOLDED CODE MARK READER WITH ELONGATED READ BEAM

**Reade Williams, South Hamilton, Mass., and Paul F. Scott, Granby, Conn., assignors to Emhart Industries, Inc., Farmington, Conn.**

**Continuation of Ser. No. 814,853, Dec. 30, 1985, abandoned. This application Jun. 23, 1987, Ser. No. 65,650**

**Int. Cl.[4] G01N** *9/04;* **G06K** *7/10*

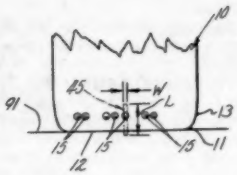
**U.S. Cl. 250—223 B** **16 Claims**

1. A method for reading raised code marks circumferentially arranged in a sector about a cylindrical sidewall of a container, said method comprising the steps of:

rotating the container;

illuminating the sector during the rotation with a substantially collimated light beam of elongated cross section as exhibited on the sidewall of the container to produce reflections from the container, the light beam cross-section having a width approximately equal to or less than a spacing between the code marks and a height substantially greater than the height of said code marks to accommodate vertical misalignment and being oriented relative to the code marks such that the light beam can essentially illuminate no more than one code mark at any time;

detecting light directed at a field optics assembly including light transmitted from a portion of the surface of said container substantially broader than the area of a raised code mark, such detected light including at least part of




the reflections of said collimated light beam from code marks, but substantially none of the reflections of said collimated light beam from other portions of the container; and

generating code identification signals corresponding over time to the intensity of the light detected by said field optics assembly.

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**4,713,537**

## METHOD AND APPARATUS FOR THE FINE POSITION ADJUSTMENT OF A LASER BEAM

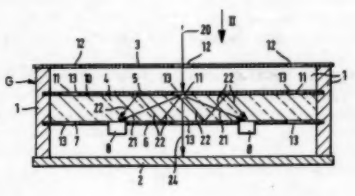
**Rino E. Kunz, Steinmaur; Jürgen R. Junghans, Büren z. Hof; Jean A. Knus, Zurich; Urs Murbach, Neuenhof, and Marcel F. Tuor, Rümlang, all of Switzerland, assignors to Gretag Aktiengesellschaft, Regensdorf, Switzerland**

**Filed Aug. 18, 1986, Ser. No. 897,259**

**Claims priority, application Switzerland, Aug. 23, 1985, 3644/85**

**Int. Cl.[4] H01J** *5/16*

**U.S. Cl. 250—227** **23 Claims**




1. An apparatus for evaluating the fine adjustment of a laser beam emitted by a laser and focused to a focal plane particularly the calibration of the beam deflection geometry, comprising:

a substrate for placement in the focal plane of the laser beam, the substrate being essentially non-absorbent of the laser light of said beam, said substrate having a plurality of marks arranged for scattering, refracting, diffracting or otherwise deflecting the laser light; and

a photoelectric device for the selective reception of the laser light scattered, refracted, diffracted or otherwise deflected, and for conversion of the received light into electrical signals.

**4,713,538**

## OPTICAL FIBER APPARATUS AND METHOD FOR REMOTELY MEASURING AN EXTERNAL PARAMETER FROM A MONITORING POSITION

**Evangelos Theocharous, London, England, assignor to Central Electricity Generating Board of Sudbury House, London, England**

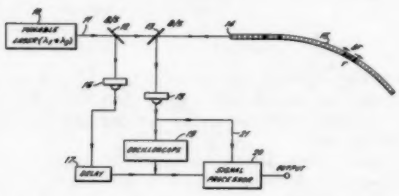
**PCT No. PCT/GB84/00136, § 371 Date Dec. 12, 1984, § 102(e) Date Dec. 12, 1984, PCT Pub. No. WO84/04439, PCT Pub. Date Nov. 8, 1984**

**PCT Filed Apr. 19, 1984, Ser. No. 681,852**

**Claims priority, application United Kingdom, Apr. 26, 1983, 8311256**

**Int. Cl.[4] G01D *5/34***

**U.S. Cl. 250—227** **14 Claims**



1. An apparatus for remotely measuring values of an external parameter at a plurality of locations from a monitoring position, said apparatus comprising:

an optical sensor means at each of the locations;

lengths of optical fiber serially interconnecting the sensor means to the monitoring position with the monitoring position at one end of the string of interconnected sensor means, the optical sensor means each being such as to permit light to pass from one optical fiber length to the next with a loss co-efficient through the sensor means which is dependent on the external parameter to be measured;

means for launching light pulses into the end of the optical fiber length at the monitoring position and monitoring backscattered energy emerging from said fiber end to determine said loss co-efficient at selected sensor means by optical time-domain reflectometry, said means for launching and monitoring including means to detect and measure the energy of the backscattered light;

timing means for controlling the detecting and measuring means to measure the backscattered energies at each of two temporally spaced times selected relative to the time of launching the light pulses to correspond to energy backscattered from a pair of points in the optical fiber lengths on opposite sides of a selected one of the sensor means; and

computing means connected to receive from said detecting and measuring means signals representing the two measured backscattered energies and arranged to compute therefrom a value for said loss co-efficient and thence said external parameter which is normalized to minimize any dependence on the launching energy of the light pulse.

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**4,713,539**

## PHOTOELECTRIC CONTROLLER DEVICE INCLUDING BRUSHES

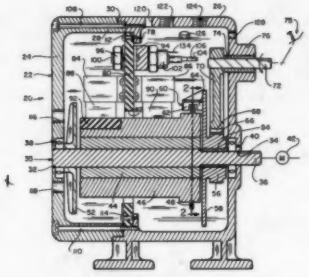
**Arthur F. Hackman, Box 12B, St. Jacob, Ill. 62281**

**Filed Sep. 12, 1986, Ser. No. 906,393**

**Int. Cl.[4] G01D *5/34***

**U.S. Cl. 250—231 SE** **25 Claims**

1. A controller device including a rotatable assembly and a drive motor operatively connected to rotate the rotatable assembly, the rotatable assembly includes a member having an outer surface formed by conductive and relatively high resistance portions, a pair of spaced brushes in slidable contact with the outer surface, one of said brushes contacting the conductive portion only and the other contacting the conductive and high resistance portions during rotation of the assembly, an annular flange having an opening formed therein on the rotatable assembly, a photocell having a light emitting portion located on one side of the annular flange and a light sensitive portion located on the opposite side of the annular flange whereby light from the light emitting portion can reach the light sensitive portion only at times when the opening is located therebetween, a circuit for the controller device including a source of energy, an electronic switching device having input, output, and gate electrodes, a load device and circuit



connections therebetween, the photocell and the brushes having circuit connections such that current flows from the energy source through the load device whenever the switching device is turned on by light from the light emitting portion of the photocell reaching the light sensitive portion thereof, said light sensitive portion having a circuit connection to the energy source and to the gate electrode of the switching device, current flowing through and between the brushes to the load whenever the switching device is turned on and as long as the brushes of said pair are both in contact with the conductive portion of the assembly.

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**4,713,540**

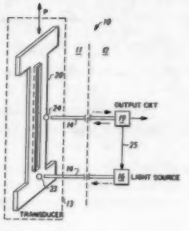
## METHOD AND APPARATUS FOR SENSING A MEASURAND

**Anthony C. Gilby, Foxboro, Mass., and Dale E. Ihnat, Woonsocket, R.I., assignors to The Foxboro Company, Foxboro, Mass.**

**Filed Jul. 16, 1985, Ser. No. 755,646**

**Int. Cl.[4] G01L *1/10*; G01D *5/26***

**U.S. Cl. 250—231 R** **27 Claims**



1. Apparatus for use in the measurement of a physical parameter by photokinetic stimulation and optical detection of resonant mechanical structures, comprising:

(a) resonant mechanical structure means for vibration;

(b) means for communicating the physical parameter to said resonant mechanical structure means;

(c) radiant energy source means for providing at least one radiant energy beam;

(d) radiant energy pathway means for communicating said

radiant energy to a first area of said resonant mechanical structure;

(e) means for directly converting said radiant energy to thermal energy conducted within at least a portion of the resonant mechanical structure to stimulate motion thereof at a frequency related to the physical parameter value; and

(f) means for returning at least a portion of the radiant energy along at least a portion of said pathway means as a modulated signal related to the resonant structure vibration.

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**4,713,541**

## OPTICAL POSITION LOCATING DEVICE

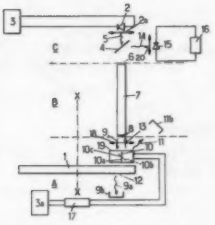
**Jean-Marie Renaud, Courbevoie; Paul Gambs, Ecully; Jean-Claude Perrot, Montigny en Cormeilles, and Jacques Taillebois, Plaisir, all of France, assignors to M.C.B., Courbevoie, France**

**Filed Dec. 19, 1985, Ser. No. 810,719**

**Claims priority, application France, Dec. 21, 1984, 84 19712**

**Int. Cl.[4] G01D** *5/34*

**U.S. Cl. 250—231 SE** **11 Claims**



**1.** A position locating device comprising:

(a) a data sensor which cooperates with a position code carrying element comprising optically coded tracks;

(b) an optoelectronic module including an electronic signal processing unit; and

(c) bidirectional optical fiber transmission means;

(i) said optoelectronic module including:

at least one optoelectronic light emitter;

bidirectional optical beam coupler;

an optoelectronic reader for transforming light signals into electric signals to be processed by said electronic signal processing unit;

a power supply for said optoelectronic light emitter and said optoelectronic reader;

said optoelectronic light emitter, said bidirectional optical beam coupler and said optoelectronic reader being disposed such that said optoelectronic light emitter emits light through said bidirectional optical beam coupler onto a first end of said bidirectional optical fiber transmission means and said optoelectronic reader receives light from said first end of said bidirectional optical fiber transmissi/ n means, through said bidirectional optical beam coupler;

(ii) said data sensor including:

a series of micromirrors for modulating light output by a second end of said bidirectional optical transmission means, each of said micromirrors being disposed opposite an associated one of said optically coded tracks of said position code carrying element, respectively, and opposite said second end of said bidirectional optical transmission means, each of said micromirrors being pivotable between a first position in which said micromirror allows said light output by said second end of said bidirectional optical transmission means to pass therethrough so that said light reaches said associated optically coded track and returns from a reflecting zone of said optically coded track to said second end of said bidirectional optical transmission means and a second position in which said micromirror reflects said light output by said second end of said bidirectional optical transmission means;

means for urging said micromirrors into said second position;

a control unit adapted for bringing said micromirrors successively and cyclically one by one into said first position; and

a self contained power source for supplying power to said control unit.

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**4,713,542**

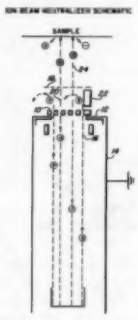
## TON BEAM NEUTRALIZER

**Joseph E. Campana, Alexandria, Va., assignor to United States of America as represented by the Secretary of the Navy**

**Filed Oct. 31, 1984, Ser. No. 666,597**

**Int. Cl.[4] H01S** *1/00, 9/00*

**U.S. Cl. 250—251** **19 Claims**



**1.** In an ion-to-neutral particle beam generator, a method of converting an energetic ion beam to an energetic neutral particle beam comprising:

directing a beam of ions toward a metal surface;

neutralizing said ions with said metal surface to produce a beam of neutralized particles; and

repelling any remaining ions out of said beam of neutral particles;

wherein said step of repelling said ions comprises passing said beam through an electrostatic repeller grid.

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**4,713,543**

## SCANNING PARTICLE MICROSCOPE

**Hans-Peter Feuerbaum, Munich; Juergen Frosien, Ottobrunn, and Rainer Spehr, Ober-Ramstadt, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Jul. 2, 1985, Ser. No. 751,020**

**Claims priority, application Fed. Rep. of Germany, Aug. 13, 1984, 3429804**

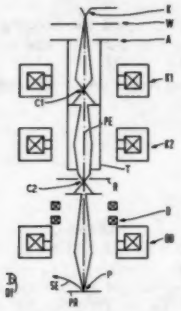
**Int. Cl.[4] H01J** *37/04*

**U.S. Cl. 250—310** **23 Claims**

**1.** A scanning particle microscope comprising:

a particle optics unit including means for generating a particle beam at a first energy, a lens system for generating at least one beam crossover, a particle deflection system and an objective lens for focussing the particles in said beam onto a specimen to be examined; and

means disposed within said particle optics unit for decelerating the particles in said beam from said first energy to a



second energy which is lower than said first energy by at least a factor of two.

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**4,713,544**

**OPTICAL SYSTEM FOR THE SIMULTANEOUS RECEPTION OF THERMAL AND LASER RADIATION**

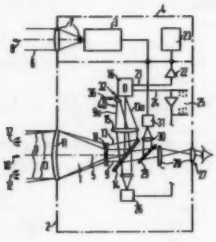
**Ludger Grage, Eichenau, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Mar. 5, 1985, Ser. No. 708,250**

**Claims priority, application Fed. Rep. of Germany, Mar. 5, 1984, 3408082; Feb. 21, 1985, 3506088**

**Int. Cl.[4] G02B *26/10***

**U.S. Cl. 250—334** **26 Claims**



1. An optical system for receiving laser radiation and thermal radiation, comprising:

a laser transmitter having an optical transmission axis and combined with a thermal image device,

scan means including a movable scan mirror operable to cyclically pivot back and forth;

a common receiving channel having an optical axis parallel to the optical axis of the transmitter laser, for receiving laser and thermal radiations and directing the same onto said scan mirror;

separation means optically coupled to said scan mirror for separating the laser and thermal radiations into separate convergent beam cones which proceed in different directions due to the movement of said scan mirror;

detector means; and

out-coupling means for receiving and coupling the separated radiations onto said detector means.

**4,713,545**

**DEVICE FOR DETECTING OBJECTS, PARTICULARLY SUCH IN MOTION**

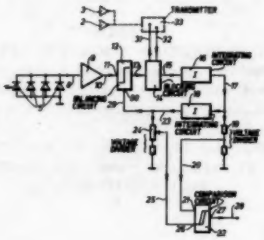
**Bo Norrgren, Akarp, and Nils Bjelk, Landskrona, both of Sweden, assignors to Besam AB, Landskrona, Sweden**

**Filed Feb. 18, 1986, Ser. No. 830,395**

**Claims priority, application Sweden, Feb. 22, 1985, 8500891**

**Int. Cl.[4] G01J *1/44***

**U.S. Cl. 250—338** **6 Claims**



1. In a device for detecting objects including a pulsed optical radiation source for transmitting light within the infra red range, and a receiver for receiving the radiation, which includes integration circuits having different integration times, means for comparing the outputs of the integration circuits, said means being adapted to deliver an operation signal as long as there is a difference in the outputs, the improvement wherein the integration circuits are connected in series, the integration circuit having the shorter integration time being connected to receive the signal level resulting from the received radiation.

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**4,713,546**

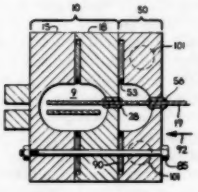
**HIGH PRESSURE SEAL**

**Charles R. Wojciechowski, West Chester, Ohio, assignor to General Electric Company, Cincinnati, Ohio**

**Filed Dec. 20, 1984, Ser. No. 684,000**

**Int. Cl.[4] G01T *1/18***

**U.S. Cl. 250—374** **11 Claims**



6. An ionization detector, comprising a first housing having first and second portions and surrounding a first chamber containing a fluid at a first pressure; a substrate which supports a plurality of conductive strips, penetrates the first housing through an opening in the first portion of the first housing, and enters the first chamber, said substrate being sealed to the first housing to inhibit leakage of fluid from said first chamber; a second housing attached to said first housing about said opening to reduce deformation of the first portion of the first housing; and a second chamber enclosed by said second housing and said first portion of said first housing and containing a fluid at a second pressure.

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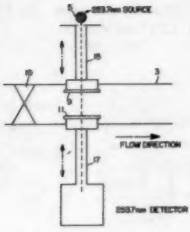
## METHOD AND APPARATUS FOR MONITORING THE FLOW OF MERCURY IN A SYSTEM

Mark W. Grossman, Belmont, Mass., assignor to GTE Products Corporation, Danvers, Mass.

Filed Jan. 3, 1986, Ser. No. 816,035
Int. Cl.[4] G01N 21/59
U.S. Cl. 250—373 21 Claims




1. A sensor for measuring the rate at which mercury passes through a system adapted for use with a narrow wavelength ultraviolet light beam source and an ultraviolet light detector, said sensor comprising:

means for forming a conduit for conveying mercury;

a pair of apertures disposed face to face and arranged on opposite sides of said conduit;

a pair of hollow support means, a portion of each being disposed inside of said conduit means and within one of said apertures;

a pair of optically transparent windows one of said windows being disposed upon each of the internal ends of said hollow support means;

means for adjusting the relative distance between the faces of said optically transparent windows;

means for forming a vacuum seal;

means for passing a narrow wavelength ultraviolet light beam through one of said windows, through the space between said windows and then through the other of said windows; and

means for passing the ultraviolet light passing through the other of said windows to an ultraviolet light detector such that absorption of the ultraviolet light is continuously measured thereby giving an indication of the rate at which mercury passes between said windows.

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4,713,548

## ELECTRON ATTACHMENT APPARATUS AND METHOD

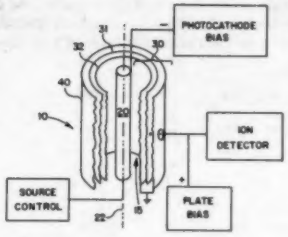
Yong W. Kim, Bethlehem, Pa., and Thomas W. Harding, Wilmington, Del., assignors to Lehigh University, Bethlehem, Pa.

Filed Nov. 12, 1985, Ser. No. 796,906
Int. Cl.[4] H01J 27/24
U.S. Cl. 250—423 R 22 Claims

1. Apparatus for producing negative ions in a fluid medium which comprises

a photoelectron emitter, including a UV light source and means for controlling said source, a photocathode disposed to be irradiated by said source, and means for biasing said photocathode negative with respect to a reference potential;

a negative ion collector in radially-spaced, coaxial relationship with said emitter, including a receiving plate, and means for biasing said plate at a positive potential with respect to said photocathode, at least one of said photocathode and said plate having cylindrical configuration; together with




means for introducing and retaining the fluid medium between said emitter and said collector for a time sufficient to produce negative ions in the fluid medium.

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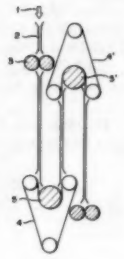
4,713,549

## RADIATION IMAGE STORAGE PANEL

Satoshi Arakawa, and Masamitu Nonomura, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed Apr. 3, 1986, Ser. No. 847,709
Claims priority, application Japan, Apr. 3, 1985, 60-70239
Int. Cl.[4] G03C 5/16
U.S. Cl. 250—484.1 3 Claims



1. A radiation image storage panel comprising a support, a phosphor layer which comprises a binder and a stimulable phosphor dispersed therein and a protective film, superposed in this order, characterized in that said protective film comprises polyethylene terephthalate, and has the longitudinal strength and the lateral strength equal to each other or in a difference therebetween of not more than 10%, the value being determined based on the larger strength, in which said protective film has the longitudinal strength and the lateral strength in a total of not less than 25 kg/mm$^2$.

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4,713,550

## DOCUMENT SIZE DETECTION APPARATUS

Shunju Anzai, Nara; Hiromu Sasaki, Yamatokoriyama; Norihide Kunikawa, Yao, and Kazuyuki Ohgita, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

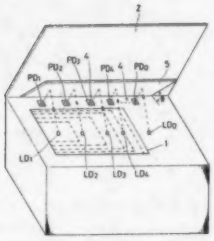
Filed Oct. 8, 1986, Ser. No. 916,725
Claims priority, application Japan, Oct. 8, 1985, 60-225047
Int. Cl.[4] G03G 15/00
U.S. Cl. 250—560 4 Claims

1. A document size detection apparatus having a plurality of sensor portions including light emitting devices and photodetector devices disposed in the vicinity of an original table for detecting the size of a document mounted on the original table by means of reflected light or transmitted light, a comparator for comparing the output level of said sensor portion with a reference level, and decision means for determining the docu-

ment size depending on the output signal of the comparator, said document size detection apparatus comprising:

means for changing the reference level for said comparator and for detecting the resultant output of the comparator;

means for finding the condition in which the reference level becomes equal to the output level of said sensor portion;



storage means for storing the value representing that condition, which are used in the adjustment mode without a document mounted on said original table; and

reference level setting means for setting the reference level to be input to said comparator depending on the value stored in said storage means, which is used in the document size decision mode for detecting the size of a document mounted on said table.

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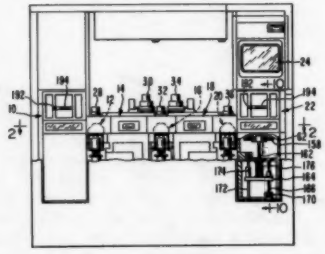
**4,713,551**

## SYSTEM FOR MEASURING THE POSITION OF A WAFER IN A CASSETTE

**Frederick P. Layman, and Michael J. Kuhlman, both of Fremont, Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.**

**Filed Apr. 17, 1986, Ser. No. 853,272**
**Int. Cl.[4] G01N *21/86***
**U.S. Cl. 250—561** **4 Claims**



1. A system for measuring the position of a wafer in a cassette, comprising:

transmitter means for sending a closely collimated beam of radiation;

receiver means for detecting the closely collimated beam of radiation;

transport means for moving the cassette past the collimated beam of radiation at a constant rate of speed;

signal processing means for translating interruptions in the collimated beam of radiation detected by said receiver means due to wafers passing through said beam as a function of time into position information by calculation of position using said constant rate of speed multiplied by elasped time;

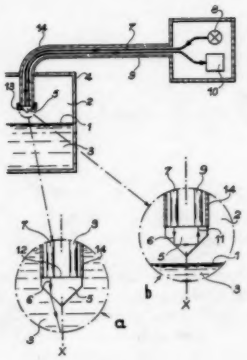
computer means for receiving and storing information from said signal processing means and for controlling said transport means.

**4,713,552**

## OPTICAL PROBE

**Jean Denis, Mesnil le roi, and Jean-Michel Decaudin, Velaux, both of France, assignors to Electricite de France (Service National), Paris, France**

**PCT No. PCT/FR84/00106, § 371 Date Dec. 24, 1984, § 102(e) Date Dec. 24, 1984, PCT Pub. No. WO84/04384, PCT Pub. Date Nov. 8, 1984**
**PCT Filed Apr. 16, 1984, Ser. No. 694,388**
**Claims priority, application France, Apr. 22, 1983, 83 06672**
**Int. Cl.[4] G01N *21/49***
**U.S. Cl. 250—577** **11 Claims**



1. Optical probe for the detection of the separating interface of two hostile media having different optical indices contained in an enclosure, comprising a cone made from a transparent material and having a predetermined refractive index able to refract an incident light beam if it is located in one of the two media whose refractive index is higher than the predetermined index and is able to reflect an incident light beam if it is located in one of the two media whose index is below the predetermined index, by means of a pair of optical fibres comprising an optical emission fibre for transmitting the incident light beam from a light source to the base of the cone and at least one optical reception fibre for transmitting the optionally reflected beam to an optoelectronic detector, the source and the detector being located outside the enclosure, characterized in that it comprises a tight casing having a reception recess for a base of the cone, said casing being closed by a cover provided with a conical opening for the passage of the cone, the casing having tight passages for the optical fibres and maintaining in a given relative position with respect to the base of the cone two of the respective ends of the two optical fibres of the said pair, two other respective ends of said two fibres being respectively positioned facing the source and facing the detector, the casing and the cone being made from materials able to resist chemical and thermal stresses in the two media.

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**4,713,553**

## FAST POWER-FAIL DETECTOR FOR POWER SUPPLIES WITH ENERGY HYSTERESIS

**Greg M. Townsend, Palatine, and Giuseppe M. DiPrizio, Glendale Heights, both of Ill., assignors to Motorola Inc., Schaumburg, Ill.**

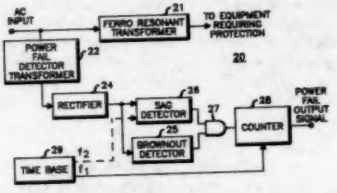
**Filed Oct. 21, 1985, Ser. No. 789,866**
**Int. Cl.[4] G01R *23/16;* H03K *5/20***
**U.S. Cl. 307—64** **36 Claims**

1. A method for rapidly detecting power signal disturbances in power systems with transformers having energy storage decay profiles, the method comprising the steps of:

comparing the power signal against a dynamic reference signal;

comparing the power signal against a relatively absolute reference signal; and

generating a power-fail signal in response to either comparison approximating its respective reference, whereby the dynamic reference signal decay is long relative to the transformer energy storage decay profile and the power-fail signal indicates a power disturbance.

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## 4,713,554

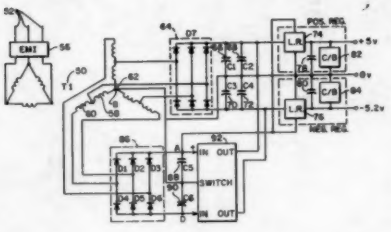
## EXTENDED RANGE REGULATED POWER SUPPLY

**Ross Henderson, North Reading, Mass., assignor to Powercube Corporation, Billerica, Mass.**

**Filed Apr. 14, 1986, Ser. No. 851,227**

**Int. Cl.[4] H02J** *9/00*

**U.S. Cl. 307—64** **5 Claims**




1. A power supply for use with a unregulated input supply comprising:

a first means for receiving said unregulated input supply providing a first output;

a second means for receiving said unregulated input supply providing a second output;

a voltage regulator for receiving said first output at an input and providing a regulated output;

means for detecting a drop-out in said unregulated input supply potential and providing a control output signal in response to the drop-out in unregulated supply potential; and

a switch to selectively provide said second output to said voltage regulator input upon receipt of said control signal permitting said voltage regulator to continuously maintain a regulated output.

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## 4,713,555

## BATTERY CHARGING PROTECTION CIRCUIT

**Robert D. Lee, Denton, Tex., assignor to Dallas Semiconductor Corporation, Dallas, Tex.**

**Filed Apr. 8, 1987, Ser. No. 36,021**

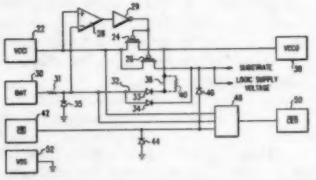
**Int. Cl.[4] H02J** *9/02*

**U.S. Cl. 307—66** **6 Claims**

1. A power supply switching circuit embodied in a CMOS integrated circuit having an N-type substrate, said power supply switching circuit having a primary power source input terminal, a backup battery input terminal, and a power supply voltage output terminal, comprising:

(a) comparison means for comparing the voltage at said primary power source input terminal to the voltage at said backup battery input terminal and for providing a first logic state at a first internal node if the voltage at said primary power supply input terminal is greater than the voltage at said backup battery input terminal, and for providing a second logic state at said first internal node if the voltage at said primary power supply input terminal is less than the voltage at said backup battery input terminal;

(b) switching means coupled between said primary power supply input terminal and said power supply voltage output terminal for making a conductive path between said primary power supply input terminal and said power supply voltage output terminal when said first internal node is at said first logic state, and for providing a high impedance between said primary power source input terminal and said power supply voltage output terminal when said first internal node is at said second logic state;




(c) first diode means coupled between said backup battery input terminal and said substrate of said CMOS integrated circuit for permitting current to flow substantially only in the direction from said backup battery input terminal to said substrate;

(d) second diode means coupled between said backup battery input terminal and a second internal node of said power supply switching circuit for permitting current to flow substantially only in the direction from said backup battery input terminal into said second internal node; and

(e) conduction means coupled between said second internal node and said power supply voltage output terminal for passing current between said second internal node and said power supply output terminal.

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## 4,713,556

## FREQUENCY CONVERTER CIRCUIT

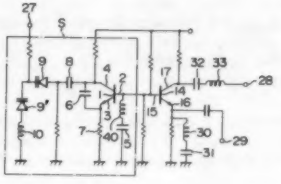
**Akio Yamamoto, and Keiro Shinkawa, both of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Nov. 8, 1985, Ser. No. 798,241**

**Claims priority, application Japan, Nov. 9, 1984, 59-235093**

**Int. Cl.[4] H03B** *19/00, 5/00*

**U.S. Cl. 307—219.1** **14 Claims**



1. A frequency converter circuit for converting a high-frequency signal into an intermediate frequency signal, comprising:

a local oscillation circuit including:

a first transistor having first, second and third terminals, said first terminal of said first transistor being coupled to ground through a first inductance and a first capacitor,

a second capacitor connected between said second and third terminals, and

a resonance circuit having variable-capacity diodes and a

second inductance, said resonance circuit being connected to said second terminal of said first transistor through a third capacitor; and

a mixer circuit including:

a second transistor having a base connected to said first terminal of said first transistor so that an oscillation frequency signal is supplied from said first terminal of said first transistor to a base of said second transistor, said second transistor further comprising an emitter connected to a high frequency signal inputting terminal for inputting a high frequency signal to said second transistor, wherein said collector of said second transistor outputs an intermediate frequency signal which intermediate frequency signal is the difference signal between said oscillation frequency signal applied to the base of said second transistor and said high frequency signal applied to said emitter of said second transistor, and further wherein the emitter of said second transistor is connected to ground through impedances which substantially become zero with respect to said intermediate frequency signal.

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**4,713,557**

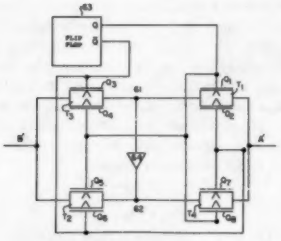
## BIDIRECTIONAL BUFFER AMPLIFIER

**William S. Carter, Santa Clara, Calif., assignor to Xilinx, Inc., San Jose, Calif.**

**Continuation of Ser. No. 655,008, Sep. 26, 1984. This application Feb. 11, 1987, Ser. No. 13,314**

**Int. Cl.[4] H03K** *17/56;* **H04B** *3/38*

**U.S. Cl. 307—242** **2 Claims**



1. A bidirectional amplifier comprising:

an amplifier having an input lead and an output lead;

first transistor means responsive to the application of a control voltage for controllably conducting a first input signal from a first terminal to said input lead;

second transistor means responsive to the application of a control voltage for controllably conducting a second input signal from a second terminal to said input lead;

third transistor means responsive to the application of a control voltage for controllably conducting an output signal of said amplifier from said output lead to said first terminal;

fourth transistor means responsive to the application of a control voltage for controllably conducting said output signal of said amplifier from said output lead to said second terminal; and

means for selectively programming said first, second, third and fourth transistor means by using control voltages such that for a first program selection said first transistor means and said fourth transistor means conduct said first input signal and said output signal, respectively, and said second transistor means and said third transistor means block said second input signal and said output signal, respectively, and for a second program selection said second transistor means and said third transistor means conduct said second input signal and said output signal, respectively, and said first transistor means and said fourth transistor means block said first input signal and said output signals, respectively; and

said means for selectively programming having a first lead connected to said first transistor means and said fourth transistor means, and having a second lead connected to said second transistor means and said third transistor means, so that said means for selectively programming generates said control voltages for controllably conducting said input and output signals independent of the state of said input signals.

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**4,713,558**

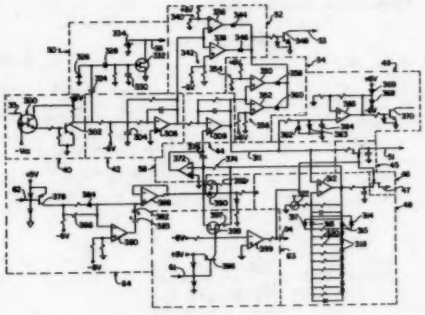
## PATIENT MONITOR FOR PROVIDING RESPIRATION AND ELECTROCARDIOGRAM SIGNALS

**Donald J. Russell, Kennessaw, and Michael A. Sanders, Woodstock, both of Ga., assignors to Healthdyne, Inc., Marietta, Ga.**

**Division of Ser. No. 396,837, Jul. 9, 1982, Pat. No. 4,506,678, which is a continuation-in-part of Ser. No. 386,187, Jun. 7, 1982, abandoned. This application Jan. 30, 1985, Ser. No. 696,510**

**Int. Cl.[4] H03K** *5/153*

**U.S. Cl. 307—264** **8 Claims**



1. A baseline correction circuit, comprising:

a line carrying a signal intended to have a predetermined DC level;

first means for sensing said DC level and altering said DC level at a rate determined by a time constant when said DC level varies from said predetermined DC level;

second means for detecting said DC level and producing a baseline correction signal when said DC level is outside of a predetermined range; and

control means responsive to said baseline correction signal to alter said time constant of said first means so as to alter the rate at which said DC level is altered by said first means;

wherein said first means comprises a charge storage device, said time constant being a time constant of said charge storage device, and said control means comprises a first circuit for altering said time constant at a predetermined rate and by controlled variable amounts.

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**4,713,559**

## MULTIPLE INPUT AND MULTIPLE OUTPUT OR/AND CIRCUIT

**Tho T. Vu, Fridley, and Kang W. Lee, Wayzata, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Apr. 29, 1985, Ser. No. 728,066**

**Int. Cl.[4] H03K** *19/02, 19/094, 19/084, 19/092*

**U.S. Cl. 307—446** **18 Claims**

1. A multiple input circuit comprising:

a plurality of groups of diodes, each said diode of each said group having an anode and a cathode;

a plurality of inputs wherein each said input is connected to only one said anode;

a plurality of nodes wherein each said node is connected to all said cathodes of only one said subplurality of said diodes;

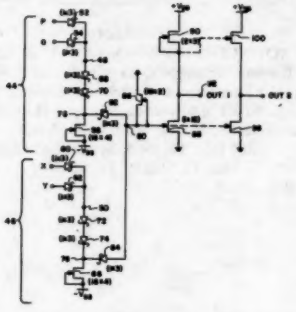
a plurality of current sinks wherein each of said current sinks is connected to only one said node of said plurality of nodes;

a plurality of diodes wherein each diode has a cathode connected to only one node of said plurality of nodes, and has an anode;

a common node connected to said anodes of said plurality of diodes;

a current source connected to said common node;

a first field effect transistor having a gate connected to said common node, having a source connected to a reference ground voltage potential and having a drain;



an output node connected to said drain of said first field effect transistor;

a second field effect transistor having a source connected to said drain of said first field effect transistor, and having a gate and a drain connected to a positive voltage source;

a first bootstrap diode having an anode connected to said drain of said second field effect transistor and having a cathode connected to said gate of said second field effect transistor; and

a second bootstrap diode having an anode connected to said gate of said second field effect transistor and having a cathode connected to said source of said second field effect transistor.

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**4,713,560**

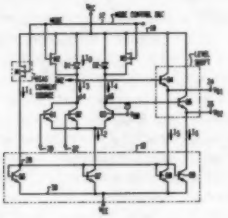
## SWITCHED IMPEDANCE EMITTER COUPLED LOGIC GATE

**William H. Herndon, Sunnyvale, Calif., assignor to Fairchild Semiconductor Corporation, Cupertino, Calif.**

**Filed Jun. 5, 1986, Ser. No. 871,639**

**Int. Cl.[4] H03K** *3/01, 17/60, 19/086, 19/02*

**U.S. Cl. 307—455** **14 Claims**



1. An apparatus for changing the power dissipation of an emitter coupled logic gate having at least two bipolar switching transistors having a common emitter terminal between high and low power modes while substantially preserving the logic output voltages comprising:

a mode control bus for receiving a mode control signal;

means coupled to said emitter coupled logic gate and said mode control bus for establishing the bias current through all said bipolar switching transistors at either of a high or a low bias current level in response to said mode control signal; and

load impedance means coupled to said mode control bus and said emitter coupled logic gate, for switching, in response to said mode control signal, from a first level of impedance while said emitter coupled logic gate is operating at said high bias current level to a second higher impedance level when said emitter coupled logic operating at said low bias current level.

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**4,713,561**

## TRANSISTOR CIRCUIT WITH CONTROLLED COLLECTOR SATURATION VOLTAGE

**Kazuyoshi Yamada, Tokyo, Japan, assignor to NEC Corporation, Japan**

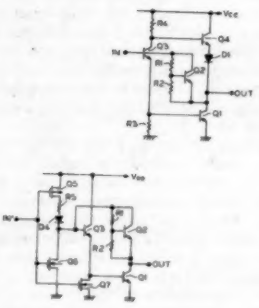
**Continuation of Ser. No. 687,385, Dec. 28, 1984, abandoned.**

**This application Feb. 10, 1987, Ser. No. 15,512**

**Claims priority, application Japan, Dec. 28, 1983, 58-247013**

**Int. Cl.[4] H03K** *19/003, 19/084, 19/088, 17/30*

**U.S. Cl. 307—456** **9 Claims**



1. A transistor circuit comprising: an input terminal for receiving an input signal; an output terminal for leading out an output signal:

a first transistor having an emitter, a base, and a collector, said collector of said first transistor being connected to said output terminal, said base and said collector of said first transistor being free from any connections to a Schottky diode;

a second transistor having a base and having a collector-emitter passage connected between said input terminal and the collector of said first transistor;

a PN junction element connected between said input terminal and the base of said first transistor;

a first resistor connected between the collector and base of said second transistor;

a second resistor connected between the base and emitter of said second transistor;

a load having one end connected to the collector of said first transistor; and

means for supplying operating power between said emitter of said first transistor and another end of said load, whereby said first transistor is prevented from being driven into saturation condition without using any Schottky diode.

## 4,713,562

## JOSEPHSON-JUNCTION LOGIC CIRCUIT

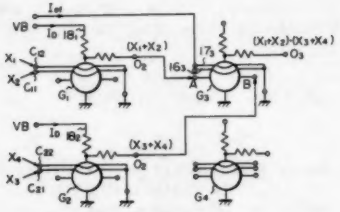
**Shinya Hasuo, and Norio Fujimaki, both of Yokohama, Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Continuation of Ser. No. 820,587, Jan. 21, 1986, abandoned, which is a continuation of Ser. No. 363,862, Mar. 31, 1982, abandoned. This application Sep. 22, 1986, Ser. No. 910,301**

**Claims priority, application Japan, Mar. 31, 1981, 56-46392; Jun. 30, 1981, 56-102859; Dec. 28, 1981, 56-215711**

**Int. Cl.[4] H03K** *19/195*

**U.S. Cl. 307—462** **13 Claims**



1. A Josephson-junction logic circuit comprising:

a plurality of Josephson-junction logic gates each including a superconductive inductance loop including an inductance and at least two Josephson junctions in said superconductive inductance loop;

each said logic gate having:

at least two current-injection lines for receiving at least two respective independent input signal currents to be injected at at least two respective different points of said superconductive inductance loop; and

at least one magnetically coupled line, each placed so as to be magnetically coupled to said superconductive inductance loop and adapted for receiving a respective input signal current,

each said logic gate having a respective threshold characteristic which is selectively shifted according to the respective input signal currents, and a selected logic function of said input signal currents being accordingly provided as an output of each said logic gate depending on the values of said input signal currents,

each said logic gate having at least three inputs corresponding to said input signal currents and at least one output corresponding to the respective output logic function, a combination of at least two of the three inputs being selected to produce a desired logic function for each said logic gate, and wirings being coupled to said selected inputs and said outputs of said logic gates so that a predetermined logic function is output from the logic circuit.

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## 4,713,563

## D.C. BLOCK CAPACITOR CIRCUIT FOR REJECTION OF D.C. OFFSET

**Christopher B. Marshall, Horley, England, and Richard C. French, Stansted, United Kingdom, assignors to U.S. Philips Corporation, New York, N.Y.**

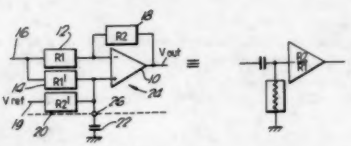
**Filed May 12, 1986, Ser. No. 862,061**

**Claims priority, application United Kingdom, May 17, 1985, 8512491**

**Int. Cl.[4] G06G** *7/12;* **H03D** *1/24, 3/00;* **H04B** *1/26*

**U.S. Cl. 307—490** **17 Claims**

1. A d.c. block capacitor circuit comprising an operational amplifier having an inverting input, a non-inverting input and an output, a first resistance means coupled between a signal input terminal and the inverting input, a second resistance means coupled between the output and the inverting input, a third resistance means coupled between the signal input terminal and the non-inverting input, a fourth resistance means coupled between the non-inverting input and a first reference voltage point, the ratio of the value of the second resistance means to the value of the first resistance means being substantially the same as the ratio of the value of the fourth resistance



means to the value of the third resistance means, and a capacitor coupled between the non-inverting input and a second reference voltage point.

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## 4,713,564

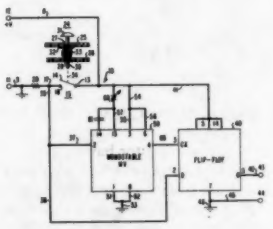
## BOUNCE-NULLIFYING SWITCH UNIT

**David B. Kimball, Shreveport, La., and Ruloff F. Kip, Jr., Westchester, N.Y., assignors to American Telephone and Telegraph Company, AT&T Information Systems, Holmdel and AT&T Bell Laboratories, Murray Hill, both of, N.J.**

**Filed Dec. 19, 1985, Ser. No. 810,958**

**Int. Cl.[4] H03K** *17/56, 5/01*

**U.S. Cl. 307—542.1** **4 Claims**



1. A bounce-nullifying switch unit comprising, input terminals for supplying d.c. power to said unit and consisting of a positive voltage terminal and a ground terminal, a switch and a resistor connected in series between said terminals with said switch and resistor having a junction therebetween and being relatively nearer to, respectively said positive voltge terminal and said ground terminal, said switch comprising contacts closeable and openable with each other and bounceable with each other after initial closure and initial opening thereof, and said series circuit being responsive to closing an dopening of said contacts to develop at said junction between said switch and resistor a voltage relative to ground which is of high and low stable level when said contacts are, respectively, closed and open, and which voltage includes trains of impulses, developed after each initial closure and opening of such contracts and caused by such bouncing thereof and providing corresponding trains of positive-going rises respective to said impulses and manifested in said voltage, a semiconductor bistable flip-flop coupled to said junction to recieve said voltage and changeable from a low to a high voltage state, and from said high voltage state back to its low voltage state, only when the stable level of said voltage is, respectively, high and low, and only when, moreover said flip-flop is clocked by a positive going clock signal, a retriggerable monostable multivibrator coupled to said junction and responsive to a positive-going rise in said voltage to change from a stable "off" state to an unstable "on" state having a one-shot duration longer than the longest period of time between consecutive ones of such impulses insaid trains, said multivibrator having its output coupled to said flip-flop and being productive at said output, for clocking said flip-flop, or a positive-going clock signal produced by reversion of said multivibrator from its "on" state to

its "off" state, and said multivibrator being repetitively retriggered by said positive-going rises in said trains thereof to repetitively renew the "on" state of such multivibrator so as to delay the production of said clock signal until after termination of the last of the impulses in the train thereof following each closure and opening of said contacts.

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**4,713,565**

## SINGLE-PHASE MOTOR WITH A MAGNETIZED ROTOR

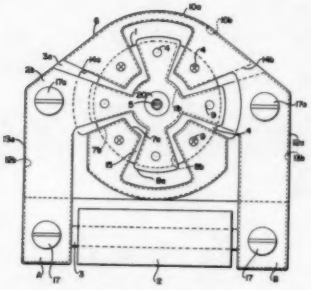
**Michel Grosjean, 1, rue des Narcisses, Bienne 2504, Switzerland**

**PCT No. PCT/CH84/00112, § 371 Date Mar. 10, 1986, § 102(e) Date Mar. 10, 1986, PCT Pub. No. WO86/00765, PCT Pub. Date Jan. 30, 1986**

**PCT Filed Jul. 11, 1984, Ser. No. 855,305**

**Int. Cl.[4] H02K** *37/00*

**U.S. Cl. 310—49 R** **7 Claims**



1. A single-phased motor, comprising:

a rotor having a first side and a second side and N pairs of poles, each of said pairs of poles having an axis of magnetization, the axes of magnetization being equidistant from and regularly distributed around an axis of rotation, each of said axes having a direction of magnetization, the directions of the magnetization of two adjacent axes being opposite one another;

a coil for rotating said rotor, said coil having a core with an axis not coaxial with the axis of rotation of said rotor;

a stator having N pole shoes, N/2 of which are located on each of said first and said second sides of the rotor, each of said stator pole shoes lying, while in a state of rest, substantially opposite one of said rotor poles having the same polarity as the stator pole shoe;

a first and a second pair of polar pieces, said first pair located on the first side of said rotor and said second pair located on the second side of said rotor, each of said first and second pairs of polar pieces comprising a peripheral polar piece coplanar and interleaved with a central polar piece, said first pair of polar pieces magnetically interconnecting the stator pole shoes located on said first side of the rotor and said second pair of polar pieces magnetically interconnecting the stator pole shoes located on said second side of the rotor, wherein the stator pole shoes interconnected by said peripheral polar pieces extend therefrom toward the axis of rotation of the rotor and the stator poles shoes interconnected by said central polar pieces extend therefrom toward a periphery of the rotor;

a plurality of connecting sections magnetically connecting each of said peripheral and central polar pieces to an end of the core of said coil; and

a breach provided in each peripheral polar piece between two of the stator pole shoes interconnected thereby, the breach of each peripheral polar piece being angularly displaced with respect to each other such that the connecting section of each central polar piece extends through a breach.

**4,713,566**

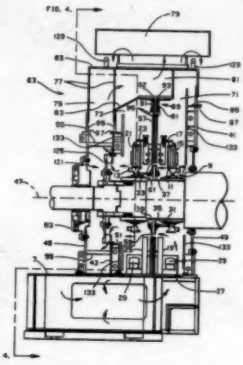
## APPARATUS FOR ENCLOSING AND COOLING TURBINE GENERATOR COLLECTOR SETS

**William G. Moore, Winter Springs, and Louis E. Nagoda, Winter Park, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Dec. 11, 1986, Ser. No. 940,671**

**Int. Cl.[4] H02K** *9/28, 13/00*

**U.S. Cl. 310—58** **12 Claims**



1. Apparatus for an electric power generator having a rotatable shaft, first and second collector rings axially spaced on said shaft and rotatable therewith, and first and second sets of stationary collector brushes supported angularly about, and in contact with, the first and second collector rings respectively; said apparatus comprising:

a generally planar baffle extending substantially transverse to said shaft between said collector rings and defining an aperture through which said shaft extends;

enclosure means forming with the baffle a first chamber enclosing said first collector ring and first set of collector brushes, and a second chamber enclosing the second collector ring and the second set of brushes, said aperture defined by said baffle forming with the shaft an annular passage between said first and second chambers;

seal means for substantially sealing off airflow between the baffle and the enclosure means; and

ventilating means for introducing air into the first chamber and withdrawing the air from the second chamber, said collector rings and collector brushes being located in the respective chambers adjacent to said aperture in the baffle such that the air introduced into the first chamber flows over said collector brushes and collector rings in both chambers in passing from the first chamber to the second chamber through said annular passage.

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**4,713,567**

## ELECTROMAGNETIC BRAKE DEVICE FOR A SPORTS TRAINING APPARATUS

**Rainer Fey, Schweinfurt, and Gerhard Dumbser, Niederwerrn, both of Fed. Rep. of Germany, assignors to Fichtel & Sachs AG**

**Filed Sep. 26, 1986, Ser. No. 912,592**

**Claims priority, application Fed. Rep. of Germany, Oct. 2, 1985, 3535157**

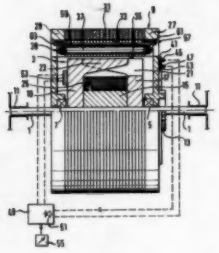
**Int. Cl.[4] A63B** *69/16*

**U.S. Cl. 310—105** **8 Claims**

1. An electromagnetic brake device for a sports training apparatus, especially an ergometer, comprising:

a stator and a rotor, rotatable in relation to the stator about an axis of rotation, wherein the stator and the rotor each comprise multi-pole iron circuits which together form a magnetic flux circuit, one of the iron circuits having a

magnetic remanence property, the iron circuits having windings allocated thereto, of which the winding allocated to the magnetically remanent iron circuit is formed as field winding and the other winding is formed as generator winding;



a slip ring arrangement for connecting the field winding with the generator winding;
a short-circuit winding allocated to the iron circuit of the generator winding; and
control circuit means for adjusting a magnitude of current fed to the field winding from the generator winding.

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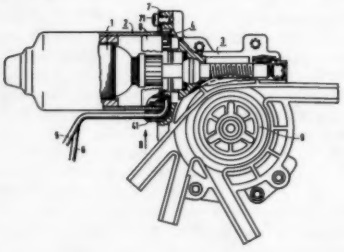
**4,713,568**
**CLOSED MOTOR/TRANSMISSION UNIT**
**Peter Adam, Hochberg, and Peter Michel, Kleinrinderfeld, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**
**Filed Sep. 9, 1986, Ser. No. 905,627**
**Claims priority, application Fed. Rep. of Germany, Sep. 26, 1985, 3534339**
**Int. Cl.[4] H02K** *7/116*
**U.S. Cl. 310—112** **10 Claims**



1. A closed motor/transmission unit, especially for a window lifter, comprising:
(a) a motor housing for containing a motor, and having a motor housing face and a motor housing hole opening to said motor housing face, and a plurality of motor housing stops disposed on said motor housing face;
(b) a transmission housing for containing a transmission for driving said motor window lifter when coupled to said motor, and including a transmission housing face with a plurality of transmission housing stops having a distribution and spacing corresponding to said motor housing stops; said transmission housing face and said motor housing face being arranged and positioned in an abutting relationship with the motor housing stops contacting said transmission housing stops;
(c) a plurality of guide projections disposed on one of said motor housing face and transmission housing face;
(d) a seal consisting of an elastic material said seal having a peripheral sealing surface rim and fitting openings, said seal being disposed between said housing faces with said stops being disposed radially outwardly of said seal and said projections passing through said fitting openings;
(e) supply wires with a feedthrough integrally secured to said seal and passing through said motor housing hole to provide power to said motor, said supply wires and feedthrough being secured to said seal by one of a molding and a vulcanizing operation with said feedthrough disposed in said motor housing hole; and
(f) means for clamping the motor and transmission housings together to squeeze said seal between said faces.

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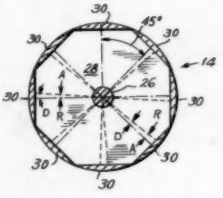
**4,713,569**
**LOW COGGING MOTOR**
**Myron Schwartz, St. James, N.Y., assignor to 501 Aeroflex Laboratories, Incorporated, Plainview, N.Y.**
**Filed Jun. 20, 1986, Ser. No. 876,634**
**Int. Cl.[4] H02K** *21/00*
**U.S. Cl. 310—152** **4 Claims**




1. An AC electric motor comprising a stator having a predetermined number of stator poles and stator windings which are AC energized to produce a rotating magnetic field and a rotor having a predetermined number of permanent magnet rotor poles characterized in that said rotor poles are circumferentially displaced by different displacement angles from respective corresponding reference positions which are mutually equally spaced about said rotor by angles equal to 360° divided by said predetermined number of rotor poles, each of said displacement angles being equal to an integral multiple of 360° divided by the product of the number of stator poles and the number of rotor poles.

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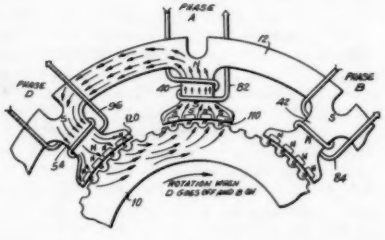
**4,713,570**
**MAGNETICALLY ENHANCED VARIABLE RELUCTANCE MOTOR SYSTEMS**
**Robert Mastromattei, Newton, Mass., assignor to Pacific Scientific Co., Rockford, Ill.**
**Filed Jun. 4, 1986, Ser. No. 870,625**
**Int. Cl.[4] H02K** *21/38, 1/24*
**U.S. Cl. 310—154** **32 Claims**




1. a stepping motor, comprising:
a stator;
a plurality of stator poles on said stator;
a winding on each of said stator poles;

a plurality spaced stator teeth on said stator poles, each of said stator poles having at least one tooth;

a mover movable relative to said stator;

said mover having a plurality of spaced mover teeth located for movement along a first direction past said stator pole teeth;

a plurality of sections of permanent magnetic material on said stator poles, each of said sections being located adjacent a stator tooth and poled in a direction transverse to the first direction;

each pole having at least one of said sections, the sections on each of said stator poles being poled transverse to the first direction but opposite to the direction of the poling of the sections on an adjacent stator pole.

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**4,713,571**

## DRIVING CIRCUIT OF A VIBRATION WAVE MOTOR

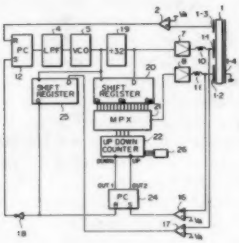
**Nobuyuki Suzuki, Yokohama; Masao Shimizu, Kawasaki, and Mitsuhiro Katsuragawa, Tanashi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 21, 1987, Ser. No. 5,871**

**Claims priority, application Japan, Jan. 23, 1986, 61-012880; Feb. 13, 1986, 61-029790; Feb. 14, 1986, 61-031395**

**Int. Cl.[4] H01L *41/08***

**U.S. Cl. 310—316** **18 Claims**




1. A vibration wave motor having a first member in which are disposed an electro-mechanical energy converting element portion to which a first frequency signal is applied and an electro-mechanical energy converting element portion to which a second frequency signal is applied and in the surface of which a travelling vibration wave is formed upon application of each of said frequency signals, and a second member driven relative to said first member by the vibration wave in said first member, said vibration wave motor having:

(a) a detecting circuit for detecting the phase difference between said first and second frequency signals; and

(b) a control circuit for controlling the phase difference between said first and second frequency signals on the basis of the result of the detection of said detecting circuit so as to be a particular phase difference.

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**4,713,572**

## ULTRASONIC TRANSDUCERS FOR ON-LINE APPLICATIONS

**Gary A. Bokowski, and David W. Vahey, both of Columbus, Ohio, assignors to AccuRay Corporation, Columbus, Ohio**

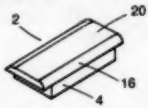
**Filed Jun. 6, 1986, Ser. No. 872,049**

**Int. Cl.[4] H01L *41/08***

**U.S. Cl. 310—323** **19 Claims**

1. A transducer for transmitting ultrasound through flexible sheet material such as paper, or receiving ultrasound therefrom in an on-line application, comprising:

(a) a piezoelectric element having the shape of a parallelepiped with corresponding dimensions of length, width, and thickness wherein length is greater than width and width is greater than thickness, and having an electrode film deposited on first and second surfaces whose dimensions are the length and width of the element, the dimensions of the element being selected so that when a voltage pulse is applied across the first and second surfaces, the element undergoes resonant vibration, predominantly in a direction parallel to the first and second surfaces; and




(b) a nosepiece having a joining surface that is rigidly attached to the second surface, and having a contacting surface for contact with the sheet material.

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**4,713,573**

## TRIGGER MECHANISM CONSTRUCTION FOR AN AUTOMOTIVE PASSENGER RESTRAINT SYSTEM

**Willi Gansert, Kornwestheim; Eduard Lochbrunner, Hemmingen, and Harry Slansky, Mühlacker, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed May 16, 1985, Ser. No. 734,872**

**Claims priority, application Fed. Rep. of Germany, Jun. 29, 1984, 3424005**

**Int. Cl.[4] H01L *41/08***

**U.S. Cl. 310—329** **20 Claims**

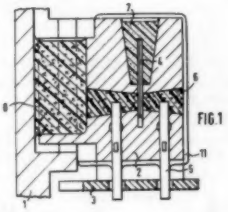


FIG.1

1. Trigger mechanism construction for an automotive passenger restraint system comprising

a housing (2);

a protective jacket (11) of silicone rubber surrounding said housing (2);

a circuit substrate board (3) having apertures formed therein;

a deceleration sensor (4) located within the housing;

electrical terminal means (5) having a portion projecting inside the housing, and electrically connected to the deceleration sensor;

externally formed projections on said terminal means (5) extending outside of the housing (2) for electrically and mechanically connecting the housing and the circuit substrate (3),

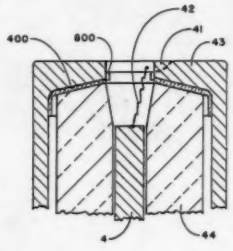
the external projections extending into openings of the circuit substrate,

and an electrically conductive adhesive (6) adhesively electrically and mechanically connecting the portions of the terminal means (5) located inside of the housing with the deceleration sensor.

## 4,713,574
## IGNITER ELECTRODE LIFE CONTROL

John C. Scott, Cincinnati, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 7, 1985, Ser. No. 784,986
Int. Cl.[4] H01J *13/20*
U.S. Cl. 313—130 1 Claim




1. A jet engine igniter for use in combination with an ignition system for a jet engine, said jet engine igniter comprising:

a center electrode which accomplishes ignition by discharging an electrical spark to an outer electrode, a ceramic insulator which surrounds the sides of the center electrode, and an outer electrode shell of stainless steel which encompasses the ceramic insulator, and

an electrical insulation coating deposited between said outer electrode shell and said ceramic insulator, said electrical insulation coating being between 5 and 10 mils in thickness and composed of oxides of tungsten, or zirconium, said electrical insulation coating thereby having thermal expansion characteristics approximately equalling those of said outer electrode shell and thereby preventing electrode material erosion and undercoating of the outer electrode shell from the electrical spark of the center electrode during use.

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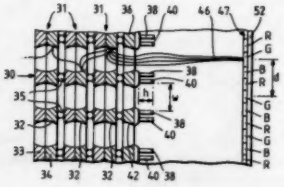
## 4,713,575
## METHOD OF MAKING A COLOR SELECTION DEFLECTION STRUCTURE, AND A COLOR PICTURE DISPLAY TUBE INCLUDING A COLOR SELECTION DEFLECTION STRUCTURE MADE BY THE METHOD

Alan G. Knapp, Crawley; Colin D. Overall, Reigate, and Richard A. M. Slater, Copthorne, all of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 26, 1986, Ser. No. 911,849
Claims priority, application United Kingdom, Oct. 21, 1985, 8525905
Int. Cl.[4] H01J *31/48, 9/12*
U.S. Cl. 313—400 13 Claims




1. A method of making a color-selection deflection structure for a color picture display tube which includes a channel plate electron multiplier provided with an extractor electrode mounted on, and electrically insulated from, the output face of the electron multiplier, the method comprising the steps of forming a plurality of parallel slits in each of a pair of metal sheets, each slit extending between opposite margins of the respective sheet, wherein each pair of adjacent slits in a respective metal sheet defines an elongate rectangular deflector electrode and strip portions which extend one from each end to the adjacent margin of the metal sheet, applying a glass to at least one of the metal sheets on a major surface of the deflector electrodes and of the margins of the metal sheet, heating the metal sheet(s) bearing the glass so as to produce an adherent coating of glass on the deflector electrodes and sheet margins, rotating the deflector electrodes on each sheet through $90\pm5°$ about axes parallel to and offset from the longitudinal axis of the respective deflector electrode, juxtaposing the two sheets so that the deflector electrodes of one sheet are in registration with the deflector electrodes of the other metal sheet, forming an integral assembly by heating the pair of juxtaposed metal sheets so as to soften the glass and urging the registered pairs of deflector electrodes and opposed sheet margins respectively towards each other, wherein the spacing between the opposed deflector electrodes and between the opposed sheet margins is determined by spacing elements provided between the said deflector electrodes and between the said sheet margins, wherein the spacer elements have a softening point above the temperature to which the juxtaposed metal sheets were heated during the formation of the integral assembly.

12. A color picture display tube comprising an envelope having an optically transparent faceplate, a cathodoluminescent screen contiguous with the internal surface of the faceplate, an apertured channel plate electron multiplier mounted adjacent to, but spaced from, the screen, an extractor electrode mounted on, and insulated from, an output face of the electron multiplier, a color selection deflection structure mounted over, and insulated from, the extractor electrode, said structure comprising pairs of opposed electrodes, said deflector electrodes being insulated from each other by spacer elements, the pairs of opposed deflector electrodes comprising contiguous strip portions of juxtaposed metal sheets which are separated from each other by the spacer elements, which strip portions have been rotated about their ends so as to be at $90°\pm5°$ to the plane of their respective sheets.

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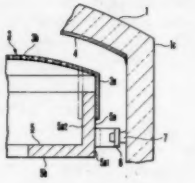
## 4,713,576
## COLOR PICTURE TUBE WITH SHADOW MASK

Akira Misumi; Ryoji Hirai, both of Mobara, and Rikizo Watanabe, Yasuki, all of Japan, assignors to Hitachi, Ltd. and Hitachi Metals, Ltd., both of Tokyo, Japan

Filed Apr. 15, 1986, Ser. No. 852,228
Claims priority, application Japan, Apr. 24, 1985, 60-86439
Int. Cl.[4] H01J *29/07;* H01B *1/02*
U.S. Cl. 313—402 9 Claims



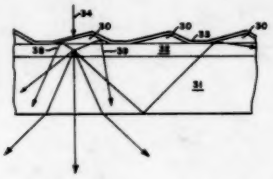
1. A color picture tube comprising a shadow mask of a precipitation strengthening Fe-Ni alloy which contains Fe-Ni as a major constituent and has at least one additive element, which additive element forms precipitation strengthening phase of $Ni_xX_y$ (wherein X is at least one element selected from the group consisting of Al, Ti, Nb, Ta and Zr; x is 2 to 4; and y is 0.5 to 1.5) and an average thermal expansion coefficient of not more than $6\times10^{-6}$/°C. in a temperature range of 20° C. to 100° C.

4,713,577

## MULTI-LAYER FACETED LUMINESCENT SCREENS

Devlin M. Gualtieri, Ledgewood, and Shui T. Lai, Florham Park, both of N.J., assignors to Allied Corporation, Morris Township, N.J.

Filed Dec. 20, 1985, Ser. No. 811,184
Int. Cl.[4] H01J 29/20; C09K 11/08
U.S. Cl. 313—468 20 Claims




1. A luminescent screen having at least two layers and comprising a luminescent crystalline sublayer that has a surface on which is a crystalline overlayer that has:

(a) the same crystal structure as the sublayer, with the sublayer being a single crystal; and

(b) a lattice constant that sufficiently exceeds the lattice constant of the sublayer that the overlayer is faceted; and

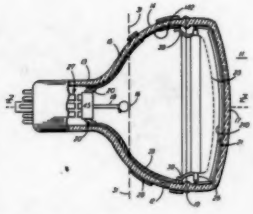
(c) said sublayer comprising $Gd_3Ga_5O_{12}$:M and said overlayer comprising $Gd_3Ga_{5-b}(S_c, In)_bO_{12}$ where b is in the range between 0 and about 2 and where M is at least one luminescent ion.

4,713,578

## GETTER ASSEMBLY WITH DIFFUSION DIRECTING STRUCTURE

Mark A. Josephs, Seneca Falls, N.Y., assignor to North American Philips Consumer Electronics Corp., New York, N.Y.

Filed Dec. 15, 1982, Ser. No. 449,897
Int. Cl.[4] H01J 29/94; F04B 37/02
U.S. Cl. 313—481 5 Claims



1. In a cathode ray tube having an envelope formed of a sealed integration of neck, funnel and panel portions providing an enclosure for structural components including a multielectrode electron gun assembly located in said neck portion in a manner to project at least one electron beam to traverse a multiapertured member and impinge upon a cathodoluminescent screen disposed on the interior surface of said panel, the funnel portion containing external and internal electrically resistive coatings interrupted in at least one area to define a clear window in the funnel wall; and a getter assembly comprising a getter container and a wand connecting the container to the electron gun assembly;

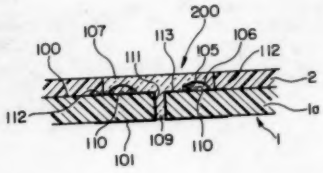
an improved getter container comprising a cylindrically shaped metal receptacle containing a sidewall member and a bottom portion, a support member attached to the bottom of said receptacle, and effusion directing means consisting of: (a) an overlapping cover disc attached to top of said receptacle; and (b) first and second tabs extending outwardly from an opening in said sidewall, the getter container located on the wand in a manner that the diffusion directors are in a plane approximately normal to said wand, and as viewed along the Z axis of the tube, is located approximately 90 degrees from the clear window area with the diffusion directors oriented to direct the diffusion of gettering material approximately 180 degrees away from said clear window area.

4,713,579

## DOT MATRIX LUMINOUS DISPLAY

Masanobu Miura, Osaka, Japan, assignor to Takiron Co., Ltd., Osaka, Japan

Filed Nov. 12, 1985, Ser. No. 796,829
Claims priority, application Japan, Nov. 12, 1984, 59-171487[U]; Apr. 5, 1985, 60-51480[U]
Int. Cl.[4] H01L 33/00
U.S. Cl. 313—500 16 Claims



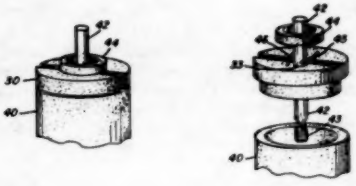

1. A dot matrix luminous display comprising: a dot matrix display board having a rigid insulating plate; first and second sets of electrodes provided on respective opposite surfaces of said insulating plate; a plurality of light emitting-elements on one surface of said plate and a plurality of through-holes in said plate through which said light emitting-elements are electrically coupled between said electrodes of said first and second sets, respectively; and a rubber elastic member which is flexible relative to said dot matrix display board, said rubber elastic member being provided over said one surface of said dot matrix display board, said rubber elastic member having a plurality of through-holes formed therein at locations corresponding to locations of said light-emitting elements, said through-holes in said member being filled with a thermosetting resin, wherein contraction of said thermosetting resin resulting from hardening of said thermosetting resin is absorbed by said rubber elastic member.

4,713,580

## SEALING STRUCTURE FOR METAL VAPOR ARC DISCHARGE LAMPS

Carl M. Schoene, North Andover, Mass., assignor to GTE Products Corporation, Danvers, Mass.

Filed Dec. 19, 1986, Ser. No. 944,690
Int. Cl.[4] H01J 61/36, 9/26
U.S. Cl. 313—624 10 Claims




1. A seal button for arc tube, said arc tube comprising a tubular envelope having an inside diameter and an outside diameter, said seal button comprising:

a first circular portion having a diameter approximately equal to the outside diameter of the arc tube, said first

circular portion having a groove extending across said diameter of said first circular portion, said groove having a depth greater than or approximately equal to the thickness of said first circular portion; and

a second circular portion concentric with and extending from said first circular portion, said second circular portion having a diameter of appropriate length for being inserted into an end of the arc tube;

said seal button having an opening extending axially through the approximate center thereof, said opening being configured for receiving the electrical feedthrough portion of an electrode assembly.

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**4,713,581**

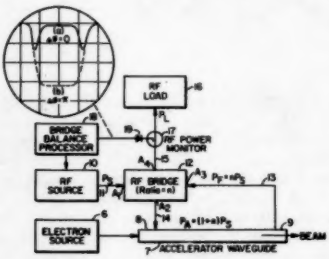
## METHOD AND APPARATUS FOR ACCELERATING A PARTICLE BEAM

**Jacob Haimson, Mountain View, Calif., assignor to Haimson Research Corporation, Palo Alto, Calif.**

**Continuation of Ser. No. 521,522, Aug. 9, 1983, abandoned. This application Dec. 20, 1985, Ser. No. 811,236**

**Int. Cl.[4] H01J** *25/10*

**U.S. Cl. 315—5.41** **32 Claims**




1. The method of accelerating a particle beam in a particle accelerator comprising the steps of:

generating radio frequency energy of a given frequency,

injecting the generated radio frequency energy in one arm of a radio frequency bridge network,

injecting remnant radio frequency energy from the output of the accelerator in a third arm of the bridge network,

directing the source energy and the accelerator remnant energy to the input of the accelerator via a second arm of the bridge network,

directing bridge network imbalance energy to a load via a fourth arm of the bridge network,

detecting the level of energy imbalance in the fourth arm of the bridge network,

changing the given frequency of the generated energy in response to the detected energy imbalance to maintain the energy imbalance in the fourth arm at a minimum.

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**4,713,582**

## SPARK PLUG

**Manabu Yamada; Ichirou Yoshida, both of Kariya; Shunzo Yamaguchi, and Morihiro Atsumi, both of Okazaki, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Apr. 3, 1986, Ser. No. 847,925**

**Claims priority, application Japan, Apr. 4, 1985, 60-71435**

**Int. Cl.[4] H01B** *1/06;* **H01T** *13/02*

**U.S. Cl. 315—58** **7 Claims**

1. A spark plug comprising:

an insulator having an internal passage extended in the axial direction of said spark plug and having two open ends;

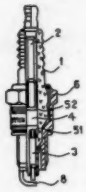
a terminal metal member fitted to one said open end of said internal passage of said insulator;

a center electrode fitted to the other said open end of said internal passage of said insulator;

a resistor positioned between said terminal metal member and said center electrode inside of said internal passage of said insulator,

said resistor being substantially free of elemental carbon and being made of a sintered material comprising by weight:

from 0.9 to 3.0% of one conductive material selected from the group consisting of titanium nitride (TiN), titanium carbide (TiC), tungsten carbide (WC), titanium boride




($TiB_2$), zirconium carbide (ZrC), hafnium carbide (HfC), silicon carbide (SiC), tantalum carbide (TaC), molybdenum silicide ($MoSi_2$) and mixtures thereof;

from 9 to 40% of fine glass powder having a larger grain size than that of said conductive material;

not more than 20% of ferrite; and

from 60 to 90% of coarse glass powder having a larger grain size than that of said fine glass powder.

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**4,713,583**

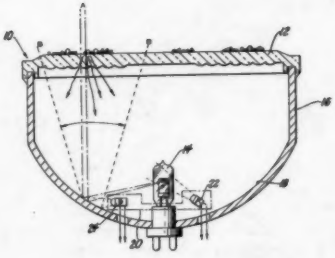
## HEADLAMP CLEANING SYSTEM

**Peter A. Hochstein, 2966 River Valley Dr., Troy, Mich. 48098**

**Continuation of Ser. No. 904,617, Sep. 8, 1986, abandoned. This application May 8, 1987, Ser. No. 48,997**

**Int. Cl.[4] B60Q** *1/02*

**U.S. Cl. 315—82** **27 Claims**




1. A vehicle headlamp assembly for use in a vehicle to indicate when the headlamps collect residue, said assembly comprising; a headlamp (**10**) including a transparent lens (**12**) with a light source (**14**) therebehind and a housing (**16**) having a reflective interior surface (**18**) about said light source (**14**) and said transparent lens (**12**), said assembly characterized by sensing means (**20**) within said housing (**16**) for sensing the amount of backscattered light radiation reflected from residue collected on the exterior of said transparent lens (**12**) and decreasing the amount of light radiation generated by said light source (**14**) and leaving said transparent lens (**12**), and control means (**26**)

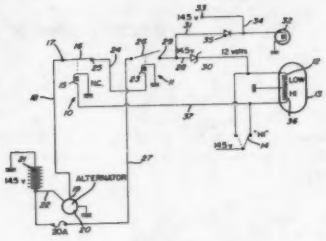
responsive to said sensing means (**20**) for indicating when said amount of said backscattered light exceeds a predetermined magnitude.

4,713,584

## VEHICLE LIGHT CONTROL SYSTEM FOR AUTOMOTIVE VEHICLES

Pierre-Paul Jean, 620, avenue Georges, St-Louis-de-France, Quebec, Canada G8T 8V6

Filed Mar. 19, 1987, Ser. No. 28,125
Int. Cl.[4] B60Q *1/02*
U.S. Cl. 315—83 9 Claims




1. A vehicle light control system comprising a first and a second switching device, said first switching device being in a normally conductive state, said second switching device being in a normally non-conductive state, said first switching device having an input connection securable to a terminal of an alternator of said automobile vehicle, said alternator being connected to a car battery supply and providing a supply voltage when an engine of said vehicle is operated, said first switching device further having an output connection connected to said second switching device to change the operating state thereof when said supply voltage is present on said input connection, said second switching circuit having a low beam connection to which said car battery supply voltage is connected and fed to a low beam filament of headlights of said vehicle, said first switching device having a third connection securable to a vehicle headlight switch high beam position so that when said headlight switch is placed to said high beam position said first switching device is placed in a non-conductive state which in turn automatically places said second switching device in a non-conductive state to cut off said supply voltage to said low beam connection.

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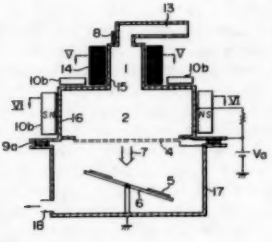
4,713,585

## ION SOURCE

Yasunori Ohno; Tomoe Kurosawa, both of Hitachi; Tadashi Sato, Mito; Yukio Kurosawa, and Yoshimi Hakamata, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 26, 1986, Ser. No. 911,790
Claims priority, application Japan, Sep. 30, 1985, 60-214627
Int. Cl.[4] H01J *7/24*
U.S. Cl. 315—111.81 10 Claims



1. An ion source, comprising a plasma producing chamber supplied with a gas for producing a plasma through high-frequency electric discharge, first magnetic means provided within said plasma producing chamber for limiting a plasma region defined within said plasma producing chamber, beam extracting means for extracting an ion beam from said plasma producing chamber, a plasma expansion chamber provided in such a manner that said plasma producing chamber is across the plasma expansion chamber from said beam extracting means, and second magnetic means for confining and holding a plasma region having an area larger than that of the plasma region formed within said plasma producing chamber.

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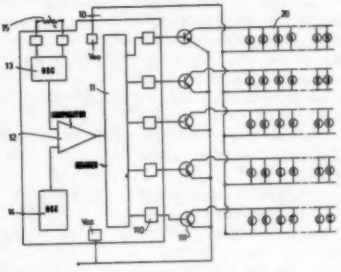
4,713,586

## DECORATIVE LIGHT SETS

Chun C. Chiang, Hsinchu, Taiwan, assignor to Dar Yu Electronic Co., Ltd., Hsinchu, Taiwan

Filed Jul. 22, 1986, Ser. No. 888,926
Int. Cl.[4] H05B *37/00*
U.S. Cl. 315—200 A 3 Claims



1. An improved decorative light set comprising:

(a) a plurality of sets of light bulbs, the light bulbs in each set being connected in parallel across first and second terminals;

(b) a first d.c. voltage source, said first terminals being connected in series to said first d.c. voltage source;

(c) a plurality of transistors respectively connected to said plurality of second terminals, a plurality of third terminals, and a plurality of fourth terminals;

(d) a second d.c. voltage source, said third terminals being connected in series to said second d.c. voltage source;

(e) a plurality of trigger means, each trigger means having an input terminal and an output terminal, the output terminal of each trigger means being connected to a corresponding fourth terminal;

(f) decoding means having a plurality of output terminals respectively connected to said input terminals of said plurality of trigger means;

(g) a comparing means having an output terminal connected to an input terminal of said decoding means;

(h) a first oscillating means having an output terminal connected to a first input terminal of said comparing means; and

a second oscillating means having an output terminal connected to a second input terminal of said comparing means,

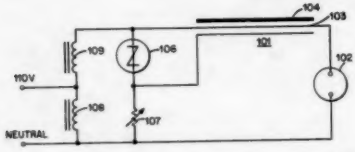
wherein said decoding means outputs signals for switching said transistors on in dependence on the output signals received from said comparing means, said switching on of said transistors controlling the activation of said corresponding sets of light bulbs.

**4,713,587**

## MULTIPULSE STARTING AID FOR HIGH-INTENSITY DISCHARGE LAMPS

**Wojciech W. Byszewski, Concord; Charles N. Fallier, Jr., Westford, and James N. Lester, Rockport, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass. and GTE Products Corporation, Stamford, Conn.**

**Filed Jan. 5, 1987, Ser. No. 495**
**Int. Cl.[4] H05B** *37/00*
**U.S. Cl. 315—289** **10 Claims**




1. A multipulse starting aid for a high intensity discharge lamp having a pair of terminals comprising

a spiral line having a pair of lines wrapped in a spiral formation, said pair of lines being physically separated from each other forming a capacitor having a capacitance C, each of said lines having a pair of ends;

a biddirectional solid state switch coupled at a point to one of said ends of one of said lines;

means for coupling the other of said ends of said one of said lines to one of said terminals;

resistive means, having a resistance R, for coupling from said bidirectional switch at a junction to the other of said terminals;

means for coupling said junction to said one of said ends of the other of said lines;

means for receiving an alternating current voltage source having a frequency F;

first inductive means coupled across said receiving means;

means for coupling said receiving means and said first inductive means to said other of said terminals;

second inductive means coupled between said receiving means and said point, whereby, during starting, said first inductive means and said second inductive means act as an autotransformer, and during operation of said lamp, said second inductive means acts as a ballast;

whereby the time constant RC is so adjusted that, upon receiving said alternating current voltage source, a waveform of voltage at said frequency F is presented across said pair of terminals of said lamp, together with a series of pulses at the peak of each half cycle of said waveform, thereby enhancing lamp startability.

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**4,713,588**

## IMAGE PICKUP TUBE

**Shigehiko Takayama, Mitaka; Hitomi Suzuki, Akishima; Masanori Maruyama, Kokubunji; Masakazu Fukushima, Tokyo, and Mitsuhiro Kurashige, Tachikawa, all of Japan, assignors to Hitachi, Ltd. and Nippon Hoso Kyokai, both of Tokyo, Japan**

**Filed Apr. 9, 1986, Ser. No. 849,832**
**Claims priority, application Japan, Apr. 10, 1985, 60-74287**
**Int. Cl.[4] H01J** *29/58*
**U.S. Cl. 315—382** **5 Claims**

1. An image pickup tube comprising:

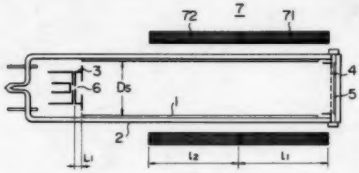
a tube containing at one end an electron gun for generating an electron beam;

a target provided at the other end of said tube and scanned with the electron beam;

an electrostatic deflection electrode provided on the inner surface of said tube for generating an electrostatic field which deflects the electron beam;

a mesh electrode interposed between said target and said electron gun; and

a focus coil system surrounding said tube, including means




for generating a magnetic field which focuses the electron beam on said target and which is distributed on the axis of said tube to have a peak of intensity which is offset toward said electron gun.

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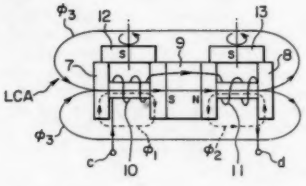
**4,713,589**

## APPARATUS FOR LINEARITY CORRECTION ON HORIZONTAL DEFLECTION

**Shigeru Kashiwagi, Iwai, Japan, assignor to Victor Company of Japan, Ltd., Japan**

**Filed Aug. 19, 1986, Ser. No. 897,981**
**Claims priority, application Japan, Aug. 20, 1985, 60-182575**
**Int. Cl.[4] H01J** *29/70, 29/76;* **H01F** *21/00;* **H01H** *1/00*
**U.S. Cl. 315—400** **9 Claims**




1. An apparatus for processing the waveform of a sawtooth current fed to a horizontal deflection coil to correct a horizontal deflection linearity on a screen of a picture tube, comprising:

a single permanent magnet;

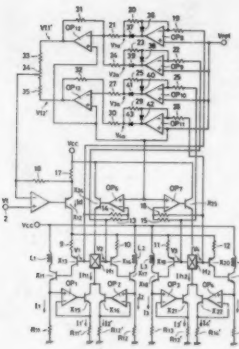
first and second saturable cores respectively coupled to north and south pole sides of said single permanent magnet with said single permanent magnet being coaxially interposed therebetween in substantially contact relation to each other so that a magnetic flux caused by said single permanent magnet circulates to pass through said first and second saturable cores in series; and

first and second windings respectively wound around said first and second saturable cores in directions opposite to each other, connected in series to each other, and connected to said horizontal deflection coil, said first and second windings being arranged such that, when a current flows therethrough in a direction, a magnetic flux caused by said first winding is added to the magnetic flux generated by said single permanent magnet with respect to said first saturable core and the magnetic flux generated by said single permanent magnet is subtracted by a magnetic flux caused by said second winding with respect to said second saturable core.

## 4,713,590
## CONTROL CIRCUIT FOR DC BRUSHLESS MOTOR PRODUCING CONSTANT OUTPUT TORQUE

Hirotoshi Ohno, Sagamihara, Japan, assignor to Victor Company of Japan, Japan

Filed Mar. 5, 1986, Ser. No. 836,626
Claims priority, application Japan, Mar. 7, 1985, 60-45240
Int. Cl.[4] H02P 6/02
U.S. Cl. 318—254 18 Claims



1. A control circuit for controlling a multi-phase brushless DC motor to produce a constant level of torque in response to a torque control signal, the motor including a stator having a plurality of armature windings each corresponding to a specific phase of said motor and a rotor having a plurality of field magnet poles of successively alternating polarity, comprising:

a plurality of Hall generators corresponding to said motor phases, each including a pair of current terminals and a pair of voltage output terminals, positioned to sense magnetic flux linkage between said poles of said rotor and said corresponding armature windings and to product sensing output signals from said voltage output terminals;

armature winding current control means operable to control levels of current supplied to said armature windings;

switching means controlled by said output signals from said Hall generators for selectively enabling and interrupting supply of current to said armature windings at levels determined by said armature winding current control means;

a plurality of feedback control circuits each responsive to a level of current flow througn an armature winding of one of said phases for supplying current to said current terminals of a Hall generator corresponding to said phase, in proportion to a level of current flow through said armature winding of said corresponding motor phase

means for rectifying said output signals from each of said Hall generators and torque sensing signal generating means for summing the resultant rectified signals from respective ones of said Hall generators to produce a torque sensing signal, and;

comparator means for comparing said torque sensing signal with said torque control signal to produce a torque error signal;

said torque error signal being applied to said armature winding current control means to control said current supply levels by negative feedback, to thereby reduce variations in output torque of said motor.

18. A control circuit for controlling a multi-phase brushless DC motor to produce a constant level of torque in response to a torque control signal, the motor including a stator having a plurality of armature windings each corresponding to a specific phase of said motor and a rotor having a plurality of field magnet poles of successively alternating polarity, comprising, corresponding to each said phase:

a Hall generator positioned to sense magnetic flux linkage between at least one armature winding corresponding to said phase, for producing a sensing output signal in response to said sensing;

rectifying means for rectifying said sensing output signal to produce a torque sensing signal;

comparator means for comparing said torque sensing signal with said torque control signal to produce a torque error signal;

current control means for producing a controlled current at a level determined by said torque error signal;

switching means for supplying a flow of current to said armature winding at a level determined by said controlled current during time intervals controlled by said sensing output signal, and;

feedback means responsive to said armature current for producing a flow of current through said Hall generator at a level which is directly proportional to said armature current level.

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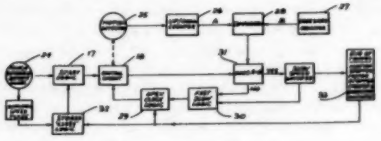
## 4,713,591
## CONTROL AND DRIVE ARRANGEMENT FOR MOVABLE MEMBERS

Paul S. McCloskey, 50 Carters Road, Dural, N.S.W., Australia (2158)

PCT No. PCT/AU85/00296, § 371 Date Jul. 30, 1986, § 102(e) Date Jul. 30, 1986, PCT Pub. No. WO86/03249, PCT Pub. Date Jun. 5, 1986
PCT Filed Nov. 29, 1985, Ser. No. 900,153
Claims priority, application Australia, Nov. 30, 1984, PG8373
Int. Cl.[4] G05D 3/12
U.S. Cl. 318—257 9 Claims



1. A controller for controlling the movement of a member between first and second positions by drive means coupled with said member, said controller comprising:

(a) counting pulse generating means coupled with said member to provide counting pulses only during movement of said member,

(b) counting means receiving and counting said counting pulses to provide a pulse count indicative of the position of said member relative to said first position,

(c) means generating a pulse count corresponding to a third position of said member between said first and second positions,

(d) comparator means comparing said position indicative pulse count and said third position pulse count,

(e) motion indicator means responsive to said counting pulse generating means to register a moving or stationary condition of said member,

(f) speed control means responsive to said comparator means to set the speed at which said member is driven to a first speed when said member is between said first and third positions and to a second speed when said member is moving towards said second position and is between said second and third positions, and

(g) drive stopping means responsive to said comparator means and to said motion indicator means to deactivate said drive means when movement of said member toward said second position is arrested while said member is between said second and third positions.

**4,713,592**

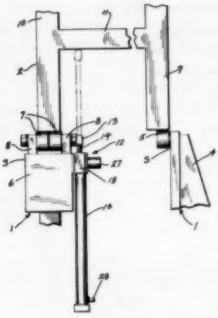
## APPARATUS FOR SENSING THE POSITION OF A STRUCTURAL MEMBER

**Lawrence C. Memmel, Mequon, Wis., assignor to Super Tool and Mfg. Corporation, Brookfield, Wis.**

**Filed Nov. 20, 1985, Ser. No. 800,136**

**Int. Cl.[4] G05B *23/02*; B23B *39/06*; B23G *1/00***

**U.S. Cl. 318—565** **3 Claims**



1. An apparatus for sensing the location of a structural member on which a working operation is to be performed, comprising conveyor means to support and convey a structural member, a housing connected to said conveyor means and having a passage extending therethrough, a cylinder connected to the housing, a piston slidable within the cylinder, a rack connected to the piston and extending from one end of said cylinder and extending through said passage, a probe mounted on the outer end of the rack, a pinion disposed within the passage and engageable with the rack, means for journalling the pinion for rotation within said passage and including a rotatable shaft, resolver means mounted on the housing for generating a signal in accordance with rotation, connecting means connecting said shaft to said resolver means to transmit rotation of said shaft to said resolver means, and means for moving said piston within said cylinder to extend said rack and move said probe into engagement with said structural mebmer, extension of said rack acting to rotate said pinion and correspondingly rotate said resolver means to establish a signal indicating the position of said structural member.

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**4,713,593**

## METHOD AND DEVICE FOR DETERMINING THE OPERATING CONDITION OR STATUS OF AN ACTUATING OR ADJUSTING DRIVE OF A PRINTING MACHINE

**Anton Rodi, Leimen, and Peter Blaser, Dielheim, both of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany**

**Filed Jul. 3, 1985, Ser. No. 752,077**

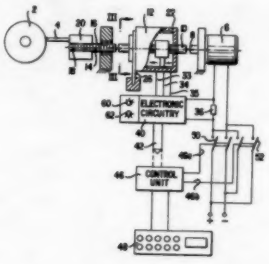
**Claims priority, application Fed. Rep. of Germany, Jul. 3, 1984, 3424349**

**Int. Cl.[4] G05B *19/25*; B41F *31/00***

**U.S. Cl. 318—572** **12 Claims**

1. Method of determining the position of a printing machine element being movable in a first and an opposite direction and being drivable by an electric motor operable in respective first and opposite directions, and a transmission having a given play therein, for linking the motor with the machine element, the method which comprises: driving the element in its first direction a distance being greater than the play; recording the value of at least one torque-dependent motor variable while the motor traverses the play while driving the element in its first direction as a first torque value; and using the first torque value during subsequent operation of the motor in the opposite direction by comparison of said first torque value with the instant motor variable, for determining the end and the beginning of the play.

6. Device for determining an operating status of a printing machine element being movable in a first and an opposite direction comprising: an electric motor for driving said machine element, in said first and opposite directions; a transmission having a given play for coupling the motor with the




machine element; means for recording the value of at least one torque-dependent motor variable while driving the machine element in its first direction as a first value, while the motor transverses the play; and means for comparing said first value with the motor variable during subsequent operation of the motor in the opposite direction, and means responsive to said comparing means for determining the end and beginning of the play.

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**4,713,594**

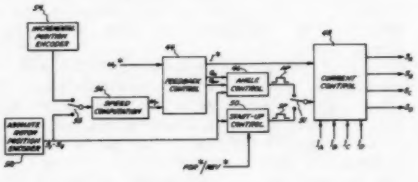
## START-UP CONTROL FOR SWITCHED RELUCTANCE MOTOR

**Bimal K. Bose, Latham, and Paul M. Szczesny, Burnt Hills, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Oct. 3, 1986, Ser. No. 915,291**

**Int. Cl.[4] G05B *19/40***

**U.S. Cl. 318—685** **16 Claims**




1. A start-up method for starting a multiphase switched reluctance motor in a commanded direction from an initial arbitrary rotor position, the switched reluctance motor including a rotor rotatable in forward and reverse directions within a stator, the rotor having a plurality of rotor poles, the stator having a multiplicity of opposing stator pole pairs, each pair of opposing stator poles sharing a common winding, respectively, and defining a separate stator phase, respectively, the start-up method comprising the steps of:

determining, for the commanded direction, an inductance profile with respect to rotor angle for each stator pole pair;

ascertaining the initial rotor position;

correlating said initial rotor position with the slope of the inductance profile for each respective stator pole pair; and

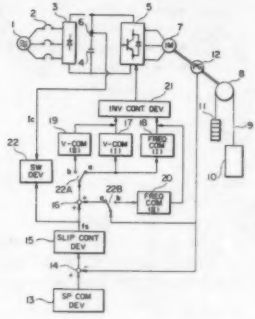
firing only stator pole pairs whose inductance profile has a positive slope at the initial rotor position, whereby rotation in the commanded direction is initiated.

4,713,595

## CONTROL APPARATUS FOR ELEVATOR

Masashi Yonemoto, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jul. 15, 1986, Ser. No. 885,761
Claims priority, application Japan, Jul. 19, 1985, 60-159564
Int. Cl.[4] H02P 3/18; B66B 1/32
U.S. Cl. 318—759 7 Claims




1. In an elevator driven by an induction motor and having a slip control device for generating a slip frequency command signal on the basis of an error between a speed command value and a running speed value of the induction motor so as to control a VVVF type inverter which in turn provides a corresponding alternating current of variable voltage and frequency, said inverter having a smoothing capacitor on a D-C side thereof,

a control apparatus for stabilizing torque of the induction motor by smoothly changing operation of the induction motor from a powering mode to a regenerative mode, said control apparatus comprising:

a current detector for detecting charging current of the smoothing capacitor, and

a switching device having a portion for detecting polarity of the slip frequency command signal and means responsive to the charging current detected by said current detector and the slip frequency command signal generated by said slip control device for changing operation of the induction motor from the powering mode to the regenerative mode only when a voltage value based on the charging current has exceeded a preset reference voltage value after a negative sign of the slip frequency command signal is detected by the polarity detection portion.

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4,713,596

## INDUCTION MOTOR DRIVE SYSTEM

Bimal K. Bose, Latham, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jul. 10, 1985, Ser. No. 753,463
Int. Cl.[4] H02P 5/34
U.S. Cl. 318—802 6 Claims

1. A drive control system for controlling an induction motor such that the position of the output shaft of said motor follows a predetermined trajectory defined by a coordinate plot of motor shaft position error against the first time derivative of said shaft position error;

said system comprising:

summing means including a plurality of summing inputs, a first summing input being coupled to receive an externally derived signal representative of the desired angular shaft position of said motor;

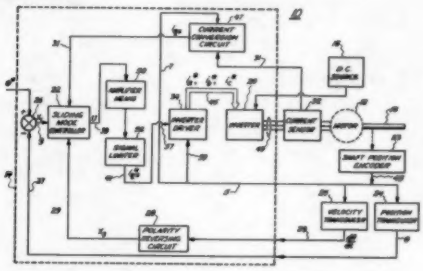
a first control loop coupled to apply a signal representative of the actual angular shaft position of said motor to a second summing input, said first control loop including shaft position transducer means adapted to provide said actual shaft position signal;

said summing means being adapted to provide a signal on its output representative of said shaft position error;

a sliding mode controller including a first input coupled to the output of said summing means;

a second control loop coupled to a second input of said sliding mode controller for applying a signal representative of shaft error velocity, said shaft error velocity signal being representative of said first time derivative of said shaft position error;

said second control loop including shaft velocity transducer means adapted to provide an output signal representative of the actual angular shaft velocity of said motor;




said second loop further including a polarity reversing circuit coupled between said velocity transducer means and said second input of said sliding mode controller for providing said shaft error velocity signal to said second sliding mode controller input as a function of said shaft velocity signal;

said sliding mode controller being adapted to provide an analog command signal on its output having an amplitude representative of the torque component of the instantaneous motor current required to maintain the operation of said motor on said predetermined trajectory; and

an inverter coupled to said motor and responsive to said command signal to apply 3-phase AC current to said motor, whereby said motor is caused to conform said actual shaft position to said desired shaft position by operating along said predetermined trajectory.

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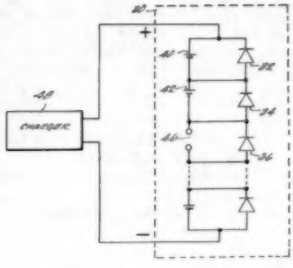
4,713,597

## SILICON DIODE LOOPING ELEMENT FOR PROTECTING A BATTERY CELL

Morrie Altmejd, Toronto, Canada, assignor to Powerplex Technologies, Inc., Downsview, Canada

Filed Dec. 4, 1985, Ser. No. 804,468
Int. Cl.[4] H02J 7/00
U.S. Cl. 320—13 14 Claims




1. A battery comprising:

a plurality of battery cells connected in series;
a plurality of diode looping elements, one looping element being connected in parallel across each said cell, each said looping element having its cathode connected to the anode of each said cell and said looping element having its anode connected to the cathode of each said cell;
said looping element being constructed so that when a predetermined amount of current is passed in a forward direction, said looping element fuses permanently into a short circuit state.

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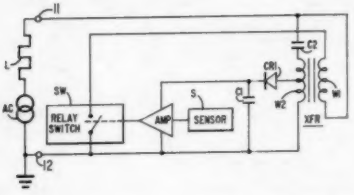
**4,713,598**

## POWER SUPPLY ASSOCIATED WITH AC LINE RELAY SWITCH

**Edgar M. Smith, Lancaster County, Pa., assignor to RCA Corporation, Princeton, N.J.**

**Filed Oct. 29, 1986, Ser. No. 924,317**
**Int. Cl.[4] G05F *1/00***
**U.S. Cl. 323—245** **14 Claims**




1. A switch for an ac main line comprising:
first and second points of connection to respective portions of said ac main line that are to be selectively connected by said switch;
a transformer having a primary winding and secondary winding each having respective first and second ends, the first end of said primary winding connecting to said first point of connection, the turns ratio between said secondary and primary windings being sufficiently high that said transformer behaves as a current transformer with regard to said primary winding connection;
a relay switch, providing a main controlled current conduction path between its connections to the second end of said primary winding and to said second point of connection, and having a control circuit for receiving a control signal that controls selective conduction through the main controlled current conduction path of said relay switch;
control means for applying said control signal to the control circuit of said relay switch; and
means for supplying dc power to said control means, including:
means for rectifying at least a portion of the voltage appearing across said secondary winding when the main controlled current conduction path of said relay switch provides closed-circuit conduction, and
means for rectifying a portion of the voltage appearing between said first and second points of connection when the main controlled current conduction path of said relay switch is relatively open-circuit nonconductive.

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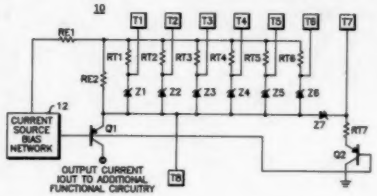
**4,713,599**

## PROGRAMMABLE TRIMMABLE CIRCUIT HAVING VOLTAGE LIMITING

**Walter L. Davis, Coral Springs, Fla., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Jan. 4, 1985, Ser. No. 689,101**
**Int. Cl.[4] G05F *3/26***
**U.S. Cl. 323—312** **5 Claims**

1. A trimmable circuit, comprising:
a first transistor, for generating an output current;
a plurality of programmable trimming networks, connected to the emitter of said first transistor, for regulating the output current of said first transistor;
said plurality of programmable trimming networks including a programmable trimming network for decreasing the output current of said first transistor and a programamble trimming network for increasing the output current of




said first transistor, said trimming network for decreasing the output current of said first transistor including a second transistor; and
a voltage-divider circuit, connected to said plurality of programmable trimming networks, for limiting the voltage across any trimming network during programming.

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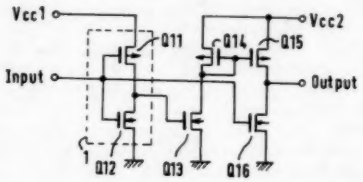
**4,713,600**

## LEVEL CONVERSION CIRCUIT

**Kazunori Tsugaru, and Yasuhiro Sugimoto, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan**

**Filed Sep. 19, 1986, Ser. No. 909,295**
**Claims priority, application Japan, Sep. 24, 1985, 60-208855**
**Int. Cl.[4] G05F *3/20***
**U.S. Cl. 323—351** **4 Claims**




1. A level conversion circuit comprising:
an input terminal means for applying a voltage signal of predetermined amplitude level;
an inverter circuit means applied by a first power supply and a second power supply and connected to said input terminal;
a first MOS transistor of a first channel type, the source of which is connected to said second power supply, and the gate of which is connected to the output of said inverter circuit means;
a current-voltage conversion means for converting from a source-drain current change of said first MOS transistor to voltage change, a first terminal of which is connected to the drain of said first MOS transistor, and a second terminal of which is connected to a third power supply;
a second MOS transistor of a second channel type, the source of which is connected to said third power supply, and the gate of which is connected to the first terminal of said current-voltage conversion means;
a third MOS transistor of the first channel type, the gate of which is connected to said input terminal, and source of which is connected to said second power supply, and drain of which is connected to the drain of said second MOS transistor; and
an output terminal means for supplying a signal, the ampli-

tude level of which is different from that of the voltage level corresponding to the signal applied to said input terminal, which is connected to the drain of said third MOS transistor;

wherein said current-voltage conversion means is a fourth MOS transistor of the second channel type, the source of which is connected to a third power supply, and the drain and gate of which are shorted to form a common connection to the drain of said first MOS transistor.

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**4,713,601**

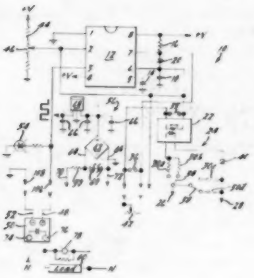
## POWER PROPORTIONING CONTROLLER FOR SOLID STATE RELAYS

**Donald E. Zahm, and Gary R. Strickler, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation of Ser. No. 780,537, Sep. 26, 1985, abandoned. This application Apr. 3, 1987, Ser. No. 33,842**

**Int. Cl.[4] G05F *1/45***

**U.S. Cl. 323—322** **10 Claims**



1. A power proportioning controller comprising:

means for receiving an analog input signal;

an astable multivibrator means for generating a variable duty cycle digital signal, said multivibrator means including a capacitive means for alternately charging and discharging over predeterminable time intervals;

optoelectronic variable resistance means having input terminals coupled to said input signal receiving means and having output terminals coupled to said capacitive means for controlling the duty cycle of said digital signal in proportion to said analog input signal by altering the relationship of said charging and discharging time intervals;

solid state relay means energized by said variable duty cycle signal for delivering proportioned power to a load;

manually adjustable potentiometer means coupled in series with said output terminals of said optoelectronic variable resistance means; and

means for selectively shorting said output terminals of said optoelectronic variable resistance means and for selectively shorting said potentiometer means.

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**4,713,602**

## CIRCUIT RESISTANCE ADJUSTING DEVICE

**Kenji Ueda, Ohtsu, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan**

**Filed Mar. 14, 1986, Ser. No. 839,718**

**Claims priority, application Japan, Mar. 14, 1985, 60-52105**

**Int. Cl.[4] G05B *24/02***

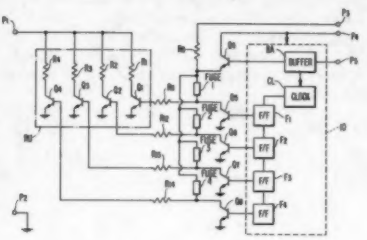
**U.S. Cl. 323—354** **4 Claims**

1. A circuit resistance adjusting device comprising

resistance means including a plurality of resistances,

switching means coupled with said resistance unit means for selectively connecting said plurality of resistances to produce a combined resistance,

patterning means connected with said switching means for receiving a first signal for controlling said switching means to selectively and sequentially connect said plurality of resistances in accordance with a predetermined pattern, and




holding means for receiving a second signal to hold said patterning means and fix the connection of said plurality of resistances so that said combined resistance is permanently fixed.

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**4,713,603**

## APPARATUS FOR THE MEASUREMENT OF THE FRACTION OF GAS IN A TWO-COMPONENT FLUID FLOW COMPRISING A LIQUID AND A GAS IN MIXTURE

**Richard Thorn, Florvåg, Norway, assignor to Den norske stats oljeselskap a.s., Norway**

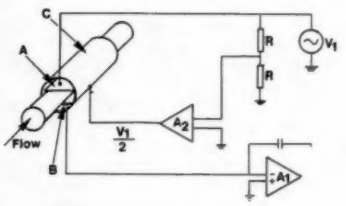
**PCT No. PCT/NO84/00046, § 371 Date Nov. 22, 1985, § 102(e) Date Nov. 22, 1985, PCT Pub. No. WO85/02016, PCT Pub. Date May 9, 1985**

**PCT Filed Oct. 29, 1984, Ser. No. 740,892**

**Claims priority, application Norway, Nov. 2, 1983, 833983**

**Int. Cl.[4] G01N *27/22, 33/28***

**U.S. Cl. 324—61 P** **4 Claims**




1. An apparatus for measuring the fraction of gas in a fluid flow comprising a gas and a liquid, said apparatus comprising:

(a) a first electrode;

(b) a second electrode positioned such that said fluid flow passes between said first and second electrode;

(c) a third electrode surrounding said first and second electrode;

(d) a sine wave generator and an operational amplifier with capacitance feedback connected to said first and second electrode for supplying an electric field to said first and second electrode thereby establishing a capacitance between said first and second electrode;

(e) a voltage divider and a buffer amplifier that is connected to said sine wave generator and to said third electrode for keeping said third electrode at an electric potential equal to the electrical potential occuring about half way between said first and second electrode; and

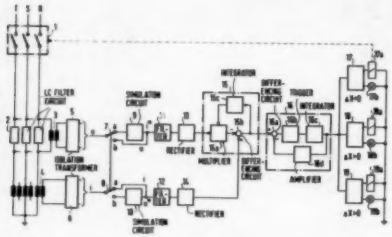
(f) means for detecting changes in the capacitance between said first and second electrode thereby measuring the fraction of gas in said fluid flow.

## 4,713,604

## MONITORING DEVICE FOR DETECTING FAULTS IN AN ELECTRICAL DEVICE, PARTICULARLY IN AN LC FILTER CIRCUIT IN AN AC VOLTAGE NETWORK

Michael Becker, Uttenreuth, and Klaus Renz, Nuremberg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Apr. 10, 1985, Ser. No. 721,600
Claims priority, application Fed. Rep. of Germany, Jun. 29, 1984, 3424082
Int. Cl.[4] G01R *31/02;* H01G *1/11;* H02H *3/38*
U.S. Cl. 324—500 5 Claims



1. A monitoring device operatively connectable to an electrical device for evaluating internal faults therein causing changes in impedance, said electrical device being connected to an electrical supply network via a network switch, said monitoring device comprising in combination:

first measuring means operatively couplable to the electrical device for sensing a voltage drop thereacross;

second measuring means operatively couplable to said electrical device for sensing a current flow therethrough;

equivalent circuit means operatively linked to said first and said second measuring means for generating estimated values of said voltage drop and said current flow from actual values of said current flow and of said voltage drop, respectively;

filter means operatively connected to said equivalent circuit means for filtering out fundamental frequencies of said estimated values and said actual values of said voltage drop and said current flow;

rectifier means operatively coupled to said filter means for converting said fundamental frequencies into amplitude-proportional direct-current voltages;

nonlinear control means including a transient comparator circuit operatively tied to said rectifier means for comparing a direct-current voltage corresponding to the estimated value of said voltage drop with a direct-current voltage corresponding to the actual value of said voltage drop, for comparing a direct-current voltage corresponding to the estimated value of said current flow with a direct-current voltage corresponding to the actual value of said current flow, and for generating signals upon detecting a substantially sudden deviation between the respective compared values; and

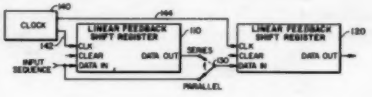
indicator and trip means operatively tied to said nonlinear control means for generating in response to signals therefrom an operator alert signal indicative of the functional status of said electrical device and for opening the network switch and thereby disconnecting said electrical device from the supply network upon the occurrence of a predetermined fault condition, said indicator and trip means including a multiplicity of independently operating limit and counting stages operatively and permanently connected in a Y-type configuration to a common output of said transient comparator circuit and responsive to respective threshold voltages of predetermined different magnitudes and directions for enabling the selective evaluation of internal faults of said electrical device simultaneously by said limit and counting stages.

## 4,713,605

## LINEAR FEEDBACK SHIFT REGISTER FOR CIRCUIT DESIGN TECHNOLOGY VALIDATION

Venkatraman Iyer, Sunnyvale, and Gil S. Lee, San Jose, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed May 17, 1984, Ser. No. 611,450
Int. Cl.[4] G01R *31/28;* G06F *11/00*
U.S. Cl. 324—73 R 7 Claims




1. Digital integrated circuit device technology validation circuitry comprising:

(a) first plural stage linear feedback shift register means connected to and responsive to a source of serial input data signals, at least one of said stages including said prototype device technology to be validated, for producing serial output data signals;

(b) second linear feedback shift register means responsive to serial input data signals for generating a plurality of internal states; and

(c) switch means connected to an output of said first linear feedback shift register means to said source of serial data, and to an input to said second linear feedback shift register means, for selecting the input to said second shift register means, and

(d) clock means connected to said first and second shift register means for providing synchronous operation of said shift register means, whereby certain of the internal states of said second linear feedback shift register means correspond to a malfunction of said device technology in response to test signals applied to said first linear feedback shift register means by said source of serial input data signals, said resulting output communicated via said switch means to said second linear feedback shift register means following the application thereto of said test signals via said switch means.

## 4,713,606

## SYSTEM FOR TESTING THE FAILURE OR SATISFACTORY OPERATION OF A CIRCUIT HAVING LOGIC COMPONENTS

André Laviron, Fontaine les Dijon, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Jul. 2, 1985, Ser. No. 751,328
Claims priority, application France, Jul. 18, 1984, 84 11388
Int. Cl.[4] G01R *31/28;* G06F *15/00*
U.S. Cl. 324—73 R 2 Claims

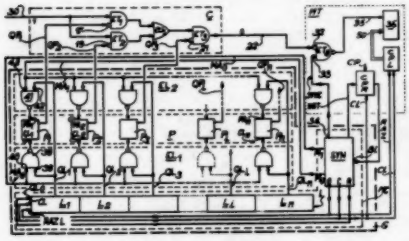
1. A system for testing the failure or satisfactory operation of a circuit having logic components, in which n components for a system of components marked 1 to n in a predetermined manner and interconnected to that said system has on one output a logic state corresponding to the failure or satisfactory operation state of the system and which depends on the failure or satisfactory operating state of each of the n components of the system, each of the n components of the system having at least one simulation input able to receive a signal simulating the failure or satisfactory operation of said system, comprising:

a generator whose outputs are respectively connected to the simulation inputs of the components these generator outputs providing simulation signals having a first or a second logic state making it possible to bring one or more components respectively into the failure or satisfactory operation

state and then conversely and reciprocally bringing said component or components into a satisfactory operation or failure state, for one or more combinations from among the n components of the system;

testing means connected to the output of the system and able to mark the logic level of the output signal of the system, these testing means comprising:

a counter having a loading input for loading a predetermined value corresponding to numbers of components to be simulated in the tested circuit, said counter having another input connected to an output of the generator for receiving an initialization signal on initializing the generator, and another input connected to an output of the generator providing a control pulse for controlling the countdown of said counter, an output of said



counter being connected to a stop control signal input of the generator for providing a signal to the generator when all the components have been simulated;

another counter connected to an output of the genertor for receiving a resetting signal, on initializing the generator and another input connected to the generator output for receiving such control pulse for controlling the incrementation of the counter content;

means for marking the logic level of the output signal of the system said means connected to the system output and to an output of the generator for receiving a synchronizing signal for each new combination of simulation signals, and connected to an output of said counter for marking the number of any component for which the change of logic level of the simulation signal applied thereto beings about a change of level of the output signal of the system.

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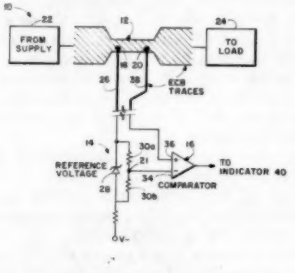
**4,713,607**

## CURRENT SENSING CIRCUIT

**Steven H. Pepper, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.**

**Filed Dec. 23, 1985, Ser. No. 812,482**
**Int. Cl.[4] G01R** *31/02, 1/30*
**U.S. Cl. 324—73 PC** **8 Claims**




1. A current sensing circuit for sensing current level and signaling if such current exceeds a predetermined detection level, comprising:

a current path of a predetermined resistance between a first voltage sense point and a second voltage sense point;

reference voltage means having an input coupled to one of the voltage sense points for sensing the voltage and shifting it a predetermined amount equal to the voltage produced across the predetermined resistance when the current through the predetermined resistance reaches the detection level; and

comparator means coupled to the reference voltage means and to the other voltage sense point for sensing and comparing the other sensed voltage with the shifted sensed voltage, the comparator means indicating that the current being sensed is below the predetermined detection level when the other sensed voltage exceeds the shifted sensed voltage and indicating that the current being sensed exceeds the predetermined level when the other sensed voltage is less than the shifted sensed voltage.

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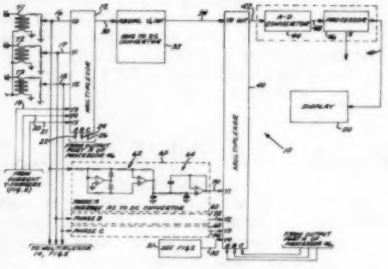
**4,713,608**

## APPARATUS FOR PROVIDING COST EFFICIENT POWER MEASUREMENT

**Robert D. Catiller, Garden Grove; John D. Faivre, Glendora, and Fah Rakpongs, Lakewood, all of Calif., assignors to Computer Power Systems Corporation, Carson, Calif.**

**Filed Mar. 6, 1986, Ser. No. 840,606**
**Int. Cl.[4] G01R** *21/06, 19/00*
**U.S. Cl. 324—142** **36 Claims**



1. Apparatus for measuring electrical power consumed in an electrical system comprising:

means for generating at least a first signal representing an ac voltage provided to said system and at least a second signal representing an ac current provided to said system;

first multiplexor means responsive to said first signal and said second signal, said first and second signals appearing at the output of said first multiplexor means in a controlled sequence;

first means coupled to the output of said first multiplexor means for converting the controlled sequence signals at said multiplexor output to corresponding dc signals;

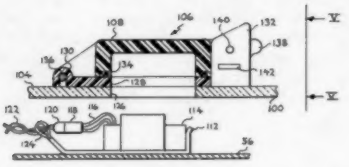
second means coupled to said first converting means for converting said dc signals to digital signals; and

means responsive to said digital signals for providing a third signals representing the product of said first and second signals, said third signal representing the apparent power provided to said system by said ac current and voltage signals.

## 4,713,609
## BATTERY BACKUP INSTALLATION FOR ELECTRIC METER

**Peter F. Losapio; Warren R. Germer, both of Dover, N.H.; Maurice J. Ouellette, North Berwick, Me., and Ansell W. Palmer, Hampton, N.H., assignors to General Electric Company, Somersworth, N.H.**

**Filed Sep. 5, 1985, Ser. No. 772,701**
**Int. Cl.[4] G01R** *1/04*
**U.S. Cl. 324—156** **8 Claims**



1. A battery installation for an electric meter, said electric meter including a cover, comprising:
- a battery replacement hatch in said cover;
- means for retaining a battery within said cover in a location accessible through said battery replacement hatch;
- means for permitting at least partly withdrawing said battery through said battery replacement hatch without disconnecting battery power from said electric meter;
- said electric meter including an electronic register module which is removable from a remainder of said electric meter;
- said electronic register module containing volatile memory elements whose contents would be lost in the event that electric power is not maintained to said electronic register module; and
- said means for permitting at least partly withdrawing includes means for permitting said battery to remain connected to said electronic register module when said electronic register module is removed from said remainder of said electric meter, whereby said electric power is maintained to prevent loss of data in said volatile memory elements when said electronic register module is removed from said electric meter.

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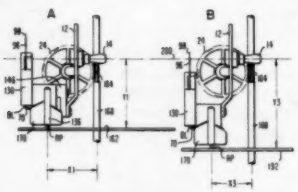
## 4,713,610
## ELECTRIC METER WITH IMPROVED SENSING HEAD ASSEMBLY

**Thomas G. Willis, Raleigh, N.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Nov. 29, 1984, Ser. No. 676,763**
**Int. Cl.[4] G01R** *11/02*
**U.S. Cl. 324—157** **13 Claims**



1. A meter apparatus, comprising:
- a frame member;
- a means for supporting a plurality of electronic components, said support means being flexible and generally non-conductive with a plurality of conductive paths connecting said electronic components;
- a bracket rigidly supported by said frame member, said bracket being shaped to retain a portion of said flexible support means, said bracket having at least one retaining clip; and
- a sensing head shaped to be received in said retaining clip, said sensing head being shaped to receive a first device and a second device in a preselected angular relation, said first and second device each being mounted to said supporting means in electrical communication with preselected ones of said plurality of conductive paths.

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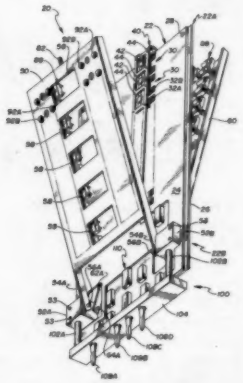
## 4,713,611
## BURN-IN APPARATUS FOR INTEGRATED CIRCUITS MOUNTED ON A CARRIER TAPE

**Russell V. Solstad, St. Paul; Millard Scott, New Hope, and William Holliday, Bloomington, all of Minn., assignors to VTC Incorporated, Bloomington, Minn.**

**Filed Jun. 23, 1986, Ser. No. 877,536**
**Int. Cl.[4] G01R** *35/00*
**U.S. Cl. 324—158 F** **11 Claims**



1. An apparatus for electrically and thermally burning in a plurality of integrated circuits mounted at spaced intervals on a carrier tape, each integrated circuit having a set of conductive leads extending outward and generally parallel to the carrier tape, the apparatus comprising:
- a base having first and second generally parallel support surfaces for supporting the carrier tape during testing;
- a first set of electrical contact arrays on the first support surface of the base, each arrays positioned for making electrical contact with leads from one of the integrated circuits mounted on the carrier tape;
- a second set of electrical contact arrays on the second support surface of the base, each array positioned for making electrical contact with leads from one of the integrated circuits mounted on the carrier tape;
- a first cover pivotally connected to the base and extending over the first set of electrical contact arrays on the first support surface when the first cover is in a closed position;
- a second cover pivotally connected to the base and extending over the second set of electrical contact arrays on the second support surface when the second cover is in a closed position;
- first pressure applying means carried by the first cover for urging the set of leads of each of the integrated circuits located adjacent the first support surface into contact with one of the first set of electrical contact arrays when the first cover is in its closed position;
- second pressure applying means carried by the second cover for urging the set of leads of each of the integrated circuits located adjacent the second support surface into contact with one of the second set of electrical contact arrays when the second cover is in its closed position;

locking means for selectively locking the first and second covers in the closed position; and

means connected to the first and second sets of electrical contact arrays for testing the integrated circuits.

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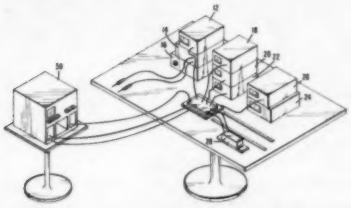
**4,713,612**

## METHOD AND APPARATUS FOR DETERMINATION OF JUNCTION-TO-CASE THERMAL RESISTANCE FOR A HYBRID CIRCUIT ELEMENT

**Henry Takamine, Gardena, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Jul. 14, 1986, Ser. No. 885,502**
**Int. Cl.[4] G01N *25/00*; G01R *31/26***
**U.S. Cl. 324—158 D** **9 Claims**



1. A method for determining the junction-to-case thermal resistance $\theta_{jc}$ of a solid-state circuit element mounted in a case, the circuit element having at least one semiconductor p-n junction, including the steps of:

(a) applying a calibration current through the junction;

(b) measuring a voltage drop across said junction for a plurality of temperatures to determine a temperature coefficient $T_c$ with said calibration current flowing through said junction;

(c) applying a substantial increase in power to said solid-state circuit element and allowing said solid-state circuit element to reach a state of thermal equilibrium with a surrounding environment;

(d) measuring a total power dissipation $P_T$ of said solid-state circuit element while keeping said base of said solid-state circuit element at a constant temperature;

(e) removing said increase in power to said solid-state circuit element and measuring a change in junction voltage drop $\Delta V_{BE}$ between low-power operation (only a small calibration current flowing) and high-power operation (substantially increased power to said solid-state circuit element); and

(f) determining said junction-to-case thermal resistance $\theta_{jc}$ by dividing said $\Delta V_{BE}$ with the product of said total power $P_T$ and said temperature coefficient $T_c$.

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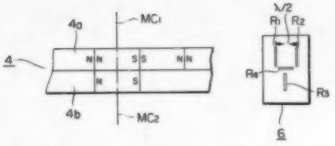
**4,713,613**

## DEVICE FOR MAGNETICALLY DETECTING DISPLACEMENT OF NON-MAGNETIC MOVABLE MEMBER

**Tadashi Takahashi; Kunio Miyashita, and Syooichi Kawamata, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Oct. 18, 1984, Ser. No. 662,013**
**Claims priority, application Japan, Oct. 19, 1983, 58-194164**
**Int. Cl.[4] G01B *7/28*; G11B *5/39*; H01L *43/08***
**U.S. Cl. 324—208** **4 Claims**

1. A device for magnetically detecting displacement of a non-magnetic movable member comprising a magnetic recording medium carried on the movable member, at least first and second tracks provided on the magnetic recording medium and juxtaposed to each other, the first track having a plurality of first magnetic signals recorded on a given length of the first track, each of the first magnetic signals including a pair of N and S poles and arranged so that the N and S poles are disposed alternately at uniform intervals along the first track, the second track having only one second magnetic signal recorded on a length of the second track juxtaposed to the given length of the first track, the second magnetic signal including a pair of N and S poles which are respectively aligned with the N and S poles of one of the first magnetic signals recorded on the given length of the first track in a direction perpendicular to the moving direction of the movable member so as to enable prevention of magnetic leakage between the respective tracks, and magneto-resistance element means fixedly disposed adjacent to




the movable member and including first and second magneto-resistance element sets facing the first and second tracks, respectively, for producing electrical signals representing variations of resistance of the first and second magneto-resistance element sets, respectively, in response to the first and second magnetic signals recorded on the respective tracks when the movable member moves so as to enable determination of the displacement of the movable member in accordance with the electrical signals produced.

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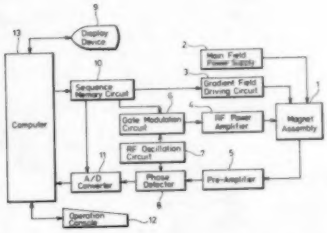
**4,713,614**

## METHOD OF CORRECTING THE PHASE AND SHADING IN A NUCLEAR MAGNETIC RESONANCE TOMOGRAPHIC DEVICE

**Kazuya Hoshino, and Hiroyuki Matsuura, both of Tokyo, Japan, assignors to Yokogawa Electric Corporation and Yokogawa Medical Systems, Limited, both of Tokyo, Japan**

**Filed Feb. 20, 1986, Ser. No. 831,342**
**Claims priority, application Japan, Feb. 25, 1985, 60-35745**
**Int. Cl.[4] G01R *33/20***
**U.S. Cl. 324—307** **1 Claim**




1. A method of correcting phase and shading in a nuclear magnetic resonance tomographic device, comprising the steps of

scanning a phantom to measure signals, subjecting said signals to a 2-dimensional inverse Fourier transformation by computer means and storing an image (Cij) thus obtained as it is in the form of a complex number in a memory means;

measuring an object to be examined by the same operational steps as recited in the foregoing steps and applying data processing to obtain an image (Oij) in the form of a complex number;

wherein said object and said phantom are placed in the same physical position during respective measurements; and

dividing the image (Oij) of said object with said image (Cij) of said phantom by the computer means, to correct distortion in the density of the image of the object and simultaneously correct distortion in the phase of the image of the

object, thereby obtaining an image of the object corrected for distortion in density and distortion in phase.

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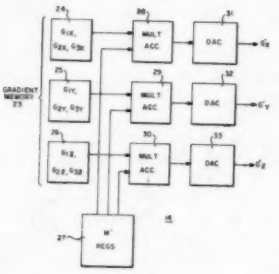
## 4,713,615
## QUANTIZATION ERROR REDUCTION METHOD FOR PHASE ENCODE GRADIENT IN NMR IMAGING

**Craig H. Barratt, Mountain View; Brian P. Wilfley, Los Gatos, and David M. Parish, Sunnyvale, all of Calif., assignors to Resonex, Inc., Sunnyvale, Calif.**

**Continuation-in-part of Ser. No. 771,068, Aug. 30, 1985. This application Jul. 25, 1986, Ser. No. 890,594**
**Int. Cl.[4] G01R *33/20***
**U.S. Cl. 324—307** **10 Claims**



1. A method for a nuclear magnetic resonance (NMR) imaging apparatus having gradient coils driven by gradient waveforms, said gradient waveforms being produced by digital to analog converters having a predetermined amplitude quantization resolution or step size, said waveforms including a first phase encode waveform which, by an incremental variation of its area, provides a parameter to spatially encode an image of a subject, said method comprising the following steps:

for said first phase encode waveform, having a fixed width and a variable amplitude, determining a desired plurality of amplitudes for providing said incremental variation of said area;

providing a plurality of said first phase encode waveforms having actual amplitudes within one said step size of said desired amplitudes, said actual amplitudes corresponding to said amplitude quantization resolution, whereby an area error is created by the difference between said actual and desired amplitudes;

and in the same spin echo sequence as a said first phase encode waveform providing an additional phase encode waveform having a width substantially smaller by at least an order of magnitude than said first waveform, such area substantially matching said area error.

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## 4,713,616
## NUCLEAR MAGNETIC RESONANCE IMAGING APPARATUS

**Toru Shimazaki, and Hiroyuki Matsuura, both of Tokyo, Japan, assignors to Yokogawa Electric Corporation and Yokogawa Medical Systems, Limited, both of Tokyo, Japan**

**Filed May 16, 1986, Ser. No. 864,000**
**Claims priority, application Japan, May 29, 1985, 60-116180**
**Int. Cl.[4] G01R *33/20***
**U.S. Cl. 324—309** **2 Claims**

1. A method of obtaining an NMR image of a plane section of an object to be examined, comprising the steps of

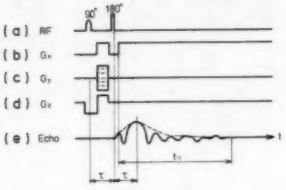
concurrently impressing a 90° RF exciting pulse to excite said object and a negative Z gradient magnetic field to selectively excite only the spins in the plane section under examination;

after termination of said 90° RF pulse, concurrently impressing a positive X gradient magnetic field, a Y gradient magnetic field and changing the negative Z gradient magnetic field to a positive Z gradient magnetic field, thereby to phase encode and prepare for observation of the echo spins;

concurrently terminating said X gradient magnetic field, said Y gradient magnetic field, and said Z gradient magnetic field, and concurrently therewith impressing a 180° RF exciting pulse on said object to invert the spins;

terminating said 180° RF exciting pulse;

impressing an X gradient magnetic field to generate an echo signal on a receiving coil;




detecting the phase and amplitude of said echo signal;

storing said echo signal in a memory and obtaining a two dimensional Fourier transform thereof;

generating a signal to substitute for data issing during a negative time from the detected phase and amplitude continuity conditions; and

operating on said Fourier transform and said generated signal substituting for the missing data, to thereby produce a reconstructed image.

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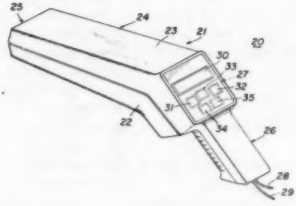
## 4,713,617
## DIGITAL TIMING LIGHT

**Steven E. Michalski, Milwaukee, Wis., assignor to Snap-on Tools Corporation, Kenosha, Wis.**

**Filed Apr. 30, 1986, Ser. No. 857,359**
**Int. Cl.[4] F02P *17/00***
**U.S. Cl. 324—395** **18 Claims**



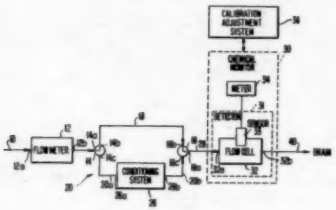

1. Digital engine timing apparatus for use in testing a multicylinder internal combustion piston engine having a control system for sequentially providing fuel ignition in the engine cylinders in a predetermined order, said timing apparatus comprising: timing light means for providing a light pulse in response to an electrical trigger pulse; pickup means responsive to each ignition in a selected cylinder for generating a pickup signal; operator-actuated means for selectively producing a variable angular value representative of an angular relationship between ignition in the selected cylinder and a predetermined position of the associated piston; and processor means operating under stored program control and coupled to said timing light means and to said pickup means and to said operator-actuated means, said processor means including timing means for generating digital data corresponding to the time period between consecutive pickup signals, means for computing from only said angular value and said digital data a time delay value corresponding to said angular value, and means for producing said trigger pulse at a time spaced from said pickup signal by a predetermined function of said time delay value.

4,713,618

## ON-LINE CALIBRATION SYSTEM FOR CHEMICAL MONITORS

**Gerald L. Carlson, Mt. Lebanon Township, Allegheny County; David F. Pensenstadler, N. Huntingdon; Warren E. Snider, Elizabeth Township, Allegheny County, and William A. Byers, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Oct. 2, 1985, Ser. No. 782,858**
**Int. Cl.[4] G01N *27/56***
**U.S. Cl. 324—438** **15 Claims**




1. A system for on-line calibration of a chemical monitor including a detector for sensing the level of a selected chemical characteristic of a fluid sample stream and producing an output representative of the sensed level of the selected chemical characteristic, comprising:

means for supplying an influent fluid sample stream at a predetermined volumetric rate;

means for conditioning the influent fluid sample stream to provide a conditioned fluid sample stream having a predetermined level of the selected chemical characteristic;

means selectively operable to establish first and second fluid sample stream flow paths, the first flow path providing the influent fluid sample stream to the detector, and the second flow path providing the influent fluid sample stream to the conditioning means and the conditioned fluid sample stream to the detector; and

means for calibrating the output representative of the sensed level of the selected chemical characteristic with respect to the predetermined level of the selected chemical characteristic in the conditioned fluid sample stream.

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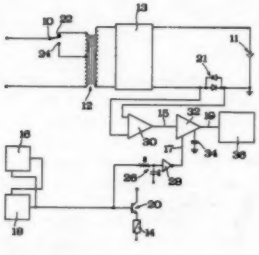
4,713,619

## ELECTRONIC DEVICE FOR FEEDING ION PUMP

**Mario Busso, Torino, and Marco Pierini, Genova, both of Italy, assignors to Varian S.p.A., Leini, Italy**

**Filed Nov. 19, 1985, Ser. No. 799,411**
**Claims priority, application Italy, Nov. 28, 1984, 68182 A/84**
**Int. Cl.[4] G01L *21/30*; F04B *37/14***
**U.S. Cl. 324—460** **9 Claims**



1. In an electronic device for feeding an ion pump and for improved measuring of the pressure in the pump, said device including a transformer having a primary winding divided into two sections, means for rectifying and filtering alternating current supplied by said transformer, and an electrometer for detecting the current fed to said pump, the improvement wherein said transformer is controlled by a means for cyclically applying to said ion pump a first relatively high voltage and a second lower voltage, and further comprising means for converting into pressure values only the current values relating to feeding of said lower voltage.

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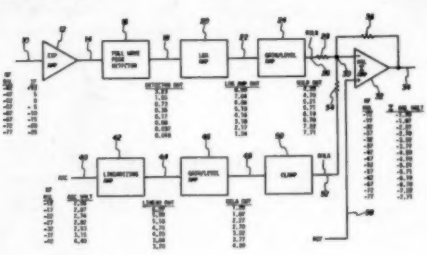
4,713,620

## DUAL SIGNAL AMPLITUDE MODIFYING AND COMBINING APPARATUS

**Ben R. Hallford, Wylie, and Karl R. Varian, Plano, both of Tex., assignors to Rockwell International Corporation, El Segundo, Calif.**

**Filed Dec. 22, 1986, Ser. No. 945,283**
**Int. Cl.[4] H03K *17/00***
**U.S. Cl. 328—150** **6 Claims**



1. Apparatus for detecting received signal levels operating in conjunction with a part-time automatic gain control amplifier comprising, in combination:

summing amplifier means, including input and output means, said output means providing an indication of received signal level amplitude;

reference level means for providing a compensating reference signal to said summing amplifier means;

first detection means, connected to said summing amplifier means, for detecting linearly changing output signals from a monitored amplifier prior to initiation of automatic gain control feedback signals, the first detection means always supplying signals of at least the amplitude of said reference signal to said summing amplifier and supplying linearly changing signals having an amplitude greater than said reference signal as the amplitude of the signal being detected drops; and

second detection means, connected to said summing amplifier means, for detecting non-linear feedback signals generated in the automatic gain control amplifier and for supplying linearly changing signals to said summing amplifier means representative of those detected having an amplitude up to a maximum of the reference level signal.

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4,713,621

## PHASE SYNCHRONIZATION CIRCUIT

**Haruhiko Nakamura, Yokohama, and Junya Tempaku, Yokosuka, both of Japan, assignors to Fujitsu Limited, Kanagawa, Japan**

**Filed Mar. 28, 1985, Ser. No. 717,198**
**Claims priority, application Japan, Mar. 29, 1984, 59-059466**
**Int. Cl.[4] H03K *3/86, 5/26***
**U.S. Cl. 328—55** **10 Claims**

1. A phase synchronization circuit for generating an output signal which is synchronized with a reference signal, said circuit comprising:

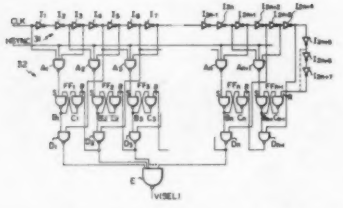
a delay circuit portion for delaying a clock signal, said delay circuit portion having a plurality of taps, said delay circuit producing delayed clock signals in sequence having different phases from said plurality of taps; and

a selection circuit portion being connected to said plurality of taps of said delay circuit portion, said selection circuit portion for selecting one of a plurality of outputs from said plurality of taps, said selection circuit portion including a plurality of adjacent selection circuit units, each selection circuit unit comprises,

a set/reset circuit having set and reset inputs and an output,

a first gate circuit having a first input terminal connected with one of said plurality of taps, a second input terminal connected with another of said plurality of taps, a third input terminal for receiving said reference signal and an output terminal connected with the set input of said set/reset circuit, said first gate circuit supplying said set/reset circuit with a set signal when the inputs to said input terminals form a predetermined relationship,

a second gate circuit having an input for receiving the output of said set/reset circuit and having another input for receiving the output of one of said delayed clock



signals, wherein said set/reset circuit in a preceeding selection circuit unit of adjacent selection circuit units is reset by an output from said second gate circuit in a following selection circuit unit,

said synchronization circuit operating such that, when a potential of said reference signal has a first binary value a set operation followed by a reset operation of said set/reset circuits is carried successively in accordance with the transmission of said clock signal along said delay circuit portion, and when the potential of said reference signal is changed to a second binary value, set/reset circuits, other than said set/reset circuit which was set immediately before said change of potential, are maintained in a reset state so that said delayed clock signal of a corresponding tap of said delay circuit portion is delivered to said output signal through said second gate circuit which receives the output of said set/reset circuit which is set immediately before said change of potential.

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**4,713,622**

## MULTIPLE STATE TONE GENERATOR

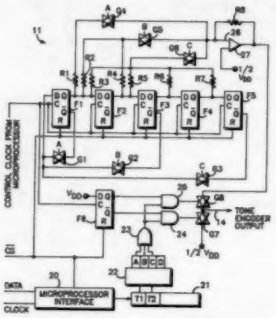
**Sanjay Wanchoo, Lauderhill, and David L. Muri, Sunrise, both of Fla., assignors to Motorola Inc., Schaumburg, Ill.**

**Filed Oct. 9, 1986, Ser. No. 917,587**
**Int. Cl.[4] G01H** *5/06*
**U.S. Cl. 328—61** **7 Claims**

1. A tone generator for producing a plurality of output tone waveforms for a plurality of frequencies comprising: means for providing plural binary state waveforms

an encoder means for selectively converting said plural binary state waveforms into a first waveform having a first number of multilevel states and a second waveform having a second number of multilevel states, less than said first number of states,

control means operatively connected to said encoder for selecting one of said first and second waveforms wherein said control means selects said second waveform for



higher frequency output tones and said first waveform for lower frequency output tones.

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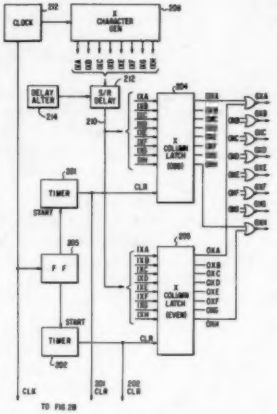
**4,713,623**

## CONTROL SYSTEM FOR MATRIX PRINT HEAD

**Dan C. Mower, Agoura; Peter H. Wolf, Campbell; Boyd E. Slade, Sunnyvale, and David Albertalli, San Jose, all of Calif., assignors to Dataproducts Corporation, Woodland Hills, Calif.**

**Continuation of Ser. No. 60,040, Jul. 24, 1979, which is a division of Ser. No. 905,705, Jun. 13, 1977, Pat. No. 4,167,342.**
**This application Dec. 14, 1981, Ser. No. 330,672**
**Int. Cl.[4] H03K** *17/00, 5/13;* **B41J** *3/02*
**U.S. Cl. 328—72** **2 Claims**



1. A timing system for controlling dot-matrix printing heads which comprises:

(a) a clock providing a series of pulses;

(b) a pair of timers each providing an output pulse having a predetermined time duration in response to an input pulse;

(c) a flip flop providing input pulses alternately to said timers in response to clock pulses;

(d) a pair of latches each having a plurality of inputs, and a plurality of outputs corresponding to said inputs, the inputs of one of said latches being paralleled with the inputs of the other of said latches;

(e) coupling means for coupling each of said timers to one of said latches whereby signals appearing at the inputs of said latches at the start of an output pulse coupled to said latch

will be coupled to the output of said latch for the duration of the output pulse coupled to said latch;

(f) a plurality of gating means coupled to the outputs of said latches, each of said gating means having an input coupled to an output of the first of said latches and another input coupled to the corresponding output of the other of said latches, whereby a signal from either of said latches will actuate said gate; and

(g) means for coupling the output of each of said gating means to a dot forming element of a dot-matrix printing head.

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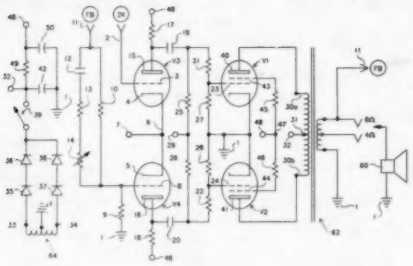
**4,713,624**

## POWER AMPLIFIER WITH MODIFIED DYNAMIC RESPONSE

**Randall C. Smith, 1317 Ross St., Petaluma, Calif. 94952**

**Filed Oct. 7, 1986, Ser. No. 916,156**
**Int. Cl.[4] H03F *3/28***
**U.S. Cl. 330—118** **5 Claims**



1. In a power amplifier for amplifying audio signals generated by a musical instrument a method for modifying the dynamic response of the power amplifier, the method comprising the steps of:

providing at least one pentode power amplifier tube means having at least a cathode element, a screen grid element and an anode element, for amplifying the audio signals and putting them out to a loudspeaker means,

impressing the audio signals generated by the musical instrument on an electron beam amplitude control electrode of the tube means,

charging a charge storage means having a predetermined discharge time constant with a charge of electrical energy to a predetermined potential,

delivering the stored charge of electrical energy to the screen grid element of the tube means,

establishing predetermined bias conditions for the tube means,

whereby increased screen grid current flow causes the charge stored in the charge storage means to discharge in accordance with its discharge time constant, thereby changing the bias conditions of said tube means and modifying the dynamic response of said power amplifier to lower its power sensitivity in accordance with the predetermined discharge time constant of the charge storage means.

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**4,713,625**

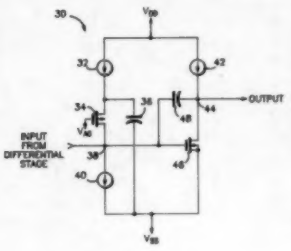
## CIRCUIT FOR IMPROVING POWER SUPPLY REJECTION IN AN OPERATIONAL AMPLIFIER WITH FREQUENCY COMPENSATION

**Roger A. Whatley, Georgetown, Tex., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Dec. 15, 1986, Ser. No. 941,878**
**Int. Cl.[4] H03F *1/26***
**U.S. Cl. 330—149** **6 Claims**

1. An output gain stage with frequency stability compensation for receiving an input signal at an input terminal and providing an output signal with high power supply rejection, comprising:

an output portion for receiving and amplifying the input signal to provide the output signal at an ouput terminal, said output portion adapted to be coupled to a power supply and having a current source coupled in series with a current sink transistor and a frequency stabilizing capacitor coupled between the input terminal and the output




terminal, said output signal having an error component of predetermined polarity resulting from error signals in the power supply; and

power supply compensation means coupled to the input terminal, for coupling a compensation component to the output signal, said compensation component having a magnitude substantially equal to the error component and a polarity opposite the predetermined polarity.

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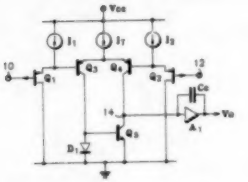
**4,713,626**

## OPERATIONAL AMPLIFIER UTILIZING JFET FOLLOWERS

**David M. Susak, Mesa, and Robert L. Vyne, Tempe, both of Ariz., assignors to Motorola Inc., Schaumburg, Ill.**

**Filed Dec. 29, 1986, Ser. No. 947,127**
**Int. Cl.[4] H03F *3/45***
**U.S. Cl. 330—253** **5 Claims**




1. An amplifier having first and second inputs, comprising:

first and second emitter coupled transistor each having a base, collector and emitter terminals, said emitter terminals for coupling to a first source of supply voltage;

current mirror means coupled to the collectors of said first and second transistor;

a first JFET having a source coupled to the base of said first transistor, a drain for coupling to a second source of supply voltage, and a gate coupled to said first input, and having a first $I_{DSS}$;

a second JFET having a source coupled to the base of said second transistor, a drain for coupling to said second source of supply voltage, and a gate coupled to said second input, and having a second $I_{DSS}$;

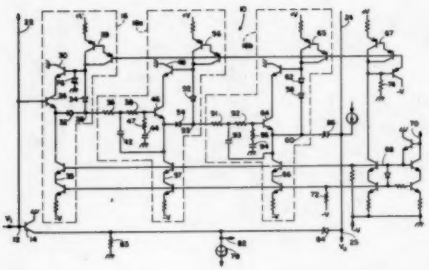
first means coupled to the source of said first JFET for supplying a first current thereto substantially equal to said first $I_{DSS}$; and

second means coupled to the source of said second JFET for supplying a second current thereto substantially equal to said second $I_{DSS}$.

## 4,713,627
## ACTIVE FILTER WITH BOOTSTRAPPING

John L. Addis, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Oct. 10, 1986, Ser. No. 917,626
Int. Cl.[4] H03F 3/04, 1/34
U.S. Cl. 330—306 10 Claims



1. An active filter comprising:

filter means for filtering an input signal to pass the signal in a predetermined bandwidth;

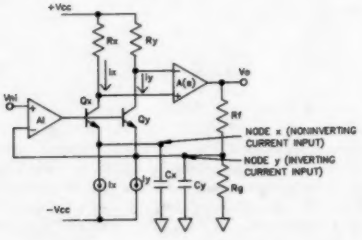
follower means coupled to the filter means for isolating the passed signal and feeding the passed signal back to the filter means to introduce phase shift into the input signal; and

bootstrap means coupled to the follower means for isolating the passed signal and feeding the passed signal back to the follower means to reduce capacitive effects of the follower means on the passed signal.

## 4,713,628
## COMPENSATION AND BIASING OF WIDEBAND AMPLIFIERS

David A. Nelson, Ft. Collins, Colo., assignor to Comlinear Corporation, Fort Collins, Colo.

Filed Oct. 8, 1986, Ser. No. 916,621
Int. Cl.[4] H03F 3/45
U.S. Cl. 330—254 8 Claims




1. A wideband amplifier employing current feedback and stray impedance cancelling circuitry to enhance high frequency performance, the wideband amplifier comprising:

first differential gain means having a noninverting input terminal for receiving a first input voltage, said first differential gain means also having an inverting input terminal and an output terminal;

first transistor means having a first terminal connected to the output terminal of said first differential gain means, said first transistor means also having second and third terminals;

second transistor means having a first terminal connected to the output terminal of said first differential gain means, said second transistor means also having second and third terminals;

second differential gain means having a noninverting input terminal connected to the third terminal of said first transistor means, an inverting input terminal connected connected to the third terminal of said second transistor means, and an output terminal comprising an output terminal of said wideband amplifier;

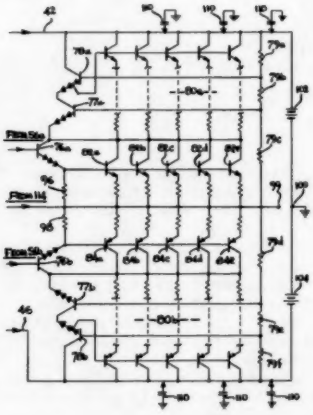
first resistor means connected between the output terminal of said second differential gain means and the second terminal of said second transistor means to provide a feedback path therebetween; and

second resistor means connected between the second terminal of said second transistor means and a source of a second input voltage, said second resistor means being operative for setting the voltage gain of said wideband amplifier.

## 4,713,629
## SEMI-CONDUCTOR TRANSFORMERLESS AUDIO AMPLIFIER

Brahm R. Segal, 4265 Carlton Avenue, Montreal, Quebec, Canada

Filed Nov. 19, 1986, Ser. No. 932,787
Int. Cl.[4] H03F 3/18, 3/26
U.S. Cl. 330—263 5 Claims



1. A semi-conductor transformerless audio amplifier comprising:

a power source having positive and negative terminals providing equal positive and negative voltages with respect to a reference source,

an output terminal,

an input signal source,

voltage amplifier means connected between the positive and negative terminals of the power source for receiving said input signal and generating a pair of outputs in phase opposition in response thereto,

separate current amplifier means for respectively amplifying each of the outputs of said voltage amplifier means,

a voltage divider formed of equal value resistors connected in series between the positive terminal and the output terminal and between the negative terminal and the output terminal,

a first set of cascaded transistors connected with the emitter of the output transistor of the cascade coupled to the output terminal and with the base of the input transistor of the cascade driven by one of said current amplifier means,

a second set of cascaded transistors connected with the emitter of the output transistor of the cascade coupled to the output terminal and with the base of the input transis-

tor of the cascade driven by the other of said current amplifier means,

a third set of cascaded transistors with the emitter of the output transistor of the cascade connected to the collectors of said first set of cascaded transistors and the collectors of said third set of transistors coupled to the positive power terminal, the base of the input transistor of the cascade of the third set of transistors being connected to a portion of the voltage divider between the positive terminal and output terminal, and

a fourth set of cascaded transistors with the emitter of the output transistor of the cascade connected to the collectors of said second set of cascaded transistors and the collectors of said fourth set of cascaded transistors coupled to the negative power terminal, the base of the input transistor of the cascade of the fourth set of transistors being connected to a portion of the voltage divider between the negative terminal and output terminal.

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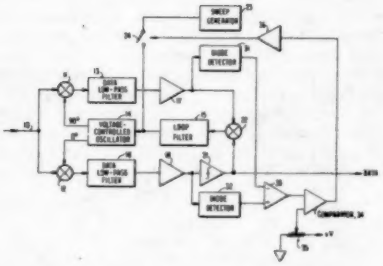
## 4,713,630
## BPSK COSTAS-TYPE PLL CIRCUIT HAVING FALSE LOCK PREVENTION

**David Matthews, Mount Airy, Md., assignor to Communications Satellite Corporation**

**Filed Jul. 29, 1986, Ser. No. 890,231**
**Int. Cl.[4] H03L *7/12*; H04L *27/22***
**U.S. Cl. 331—4** **7 Claims**



1. A BPSK Costas-type PLL circuit in which false lock-in is prevented by distinguishing between true lock-in and false lock-in, comprising:

0° and 90° sub-loops, said 0° sub-loop comprising a first mixer receiving on a first input a BPSK IF signal, a first low-pass filter and amplifier coupled in series with one another and receiving as an input an output of said first mixer, a multiplier receiving on a first input an output of said first low-pass filter and amplifier, a loop filter having an input coupled to an output of said multiplier, and a voltage-controlled oscillator receiving as a control-voltage input an output of said loop filter, a 0° output of said voltage-controlled oscillator being coupled to a second input of said first mixer, and said 90° sub-loop comprising a second mixer receiving on a first input said BPSK IF signal, a second low-pass filter and amplifier coupled in series with one another and receiving as an input an output of said second mixer, said multiplier receiving on a second input an output of said second low-pass filter and amplifier, said 90° sub-loop including said loop filter and said voltage-controlled oscillator, A 90° output of said voltage-controlled oscillator being coupled to a second input of said second mixer;

sweep generator means coupled to said voltage-controlled oscillator for locking said 0° and 90° sub-loops on to said BPSK IF signal;

means for detecting a difference in AC signal levels in said 0° and 90° sub-loops; and

means for on/off controlling said sweep generator means in response to an output of said difference detecting means.

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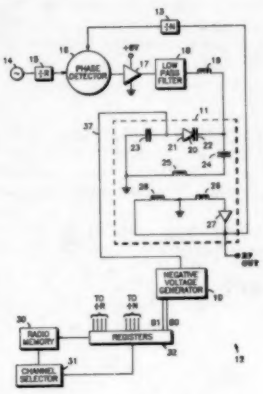
## 4,713,631
## VARACTOR TUNING CIRCUIT HAVING PLURAL SELECTABLE BIAS VOLTAGES

**Ralph T. Enderby, Sunrise; Enrique Ferrer, Miami, and Wayne P. Shepherd, Sunrise, all of Fla., assignors to Motorola Inc., Schaumburg, Ill.**

**Filed Jan. 6, 1986, Ser. No. 816,589**
**Int. Cl.[4] H03B *5/08*; H03H *5/12*; H03L *7/18***
**U.S. Cl. 331—36 C** **7 Claims**



1. A variable capacitance circuit comprising:

a varactor having an anode side and a cathode side,

a first voltage bias means connected to one of said sides of the varactor for applying a variable voltage to the varactor,

a second voltage bias means connected to the other of said sides of the varactor for selectively applying one of a plurality of voltages to the varactor, wherein the first and second bias means cooperatively control the capacitance of the varactor,

the second voltage bias means including a voltage multiplier circuit having an output, and

a voltage divider network connected to the output of the voltage multiplier circuit for supplying said plurality of voltages.

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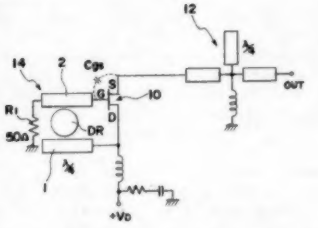
## 4,713,632
## BAND REFLECTION TYPE FET DIELECTRIC RESONATOR OSCILLATOR

**Toshio Nishikawa, Nagaokakyo, and Sadahiro Tamura, Kyoto, both of Japan, assignors to Murata Manufacturing Co., Ltd., Nagaokakyo, Japan**

**Continuation-in-part of Ser. No. 615,537, May 31, 1984, abandoned. This application May 16, 1986, Ser. No. 863,999**
**Claims priority, application Japan, Jun. 3, 1983, 58-99971**
**Int. Cl.[4] H03B *5/18***
**U.S. Cl. 331—117 D** **4 Claims**



1. A band reflection type oscillator comprising:

an FET having a source, a gate and a drain;
a stripline connected to said gate;
a resonator provided adjacent said stripline in a magnetically coupled relationship therewith; and
a first stripline stub having a length equal to $(n/2+\frac{1}{4})$ wavelength, wherein n is zero or a positive integer, said stub position adjacent said resonator in a magnetically coupled relationship therewith and having a first end which is connected to said drain and a second end which is open ended, thereby substantially grounding said drain in terms of high frequency and, at the same time, forming a positive feedback circuit between said drain and said gate through said resonator.

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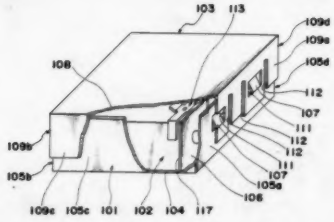
**4,713,633**

## COVER ATTACHING ARRANGEMENT FOR CASING OF DIELECTRIC COAXIAL RESONATORS

**Koji Saito, and Hiroshi Okawa, both of Kanazawa, Japan, assignors to Murata Manufacturing Co., Ltd., Nagokakyo, Japan**

**Filed Dec. 19, 1986, Ser. No. 943,391**
**Claims priority, application Japan, Dec. 24, 1985, 60-295736**
**Int. Cl.[4] H01P** *1/205*
**U.S. Cl. 333—222** **6 Claims**




1. A cover attaching arrangement for a casing of dielectric coaxial resonators, which comprises a casing having side walls extending upwardly approximately at right angles with respect to its bottom wall so as to accommodate the dielectric coaxial resonators therein, a cover member having side walls extending downwardly approximately at right angles with respect to its top wall and adapted to be fitted over said casing, said side walls of either one of said casing or said cover member being formed with engaging pieces, with the other thereof being formed with corresponding engaging openings so as to retain said casing unreleasable from said cover member upon fitting of said engaging pieces with said engaging openings, and a spring means provided between the dielectric coaxial resonator and said cover member or between said dielectric coaxial resonator and said casing so as to urge said cover member in a direction for engagement between said engaging pieces and said engaging openings.

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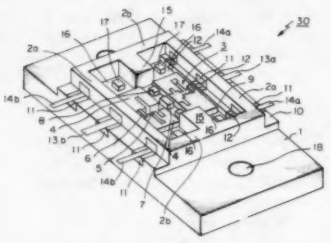
**4,713,634**

## SEMICONDUCTOR DEVICE MOUNTED IN A HOUSING HAVING AN INCREASED CUTOFF FREQUENCY

**Shigeyuki Yamamura, Sagamihara, Japan, assignor to Fujitsu Limited, Kanagawa, Japan**

**Filed Mar. 5, 1985, Ser. No. 708,609**
**Claims priority, application Japan, Mar. 6, 1984, 59-042605**
**Int. Cl.[4] H05K** *5/04*
**U.S. Cl. 333—245** **3 Claims**

1. A semiconductor device comprising:
a metallic container comprising a bottom surface, a first pair of opposite side walls and a second pair of opposite side walls, said first pair of side walls being perpendicular to said second pair of side walls thereby forming a rectangular frame on said bottom surface, said container enclosing a radio frequency semiconductor circuit having a semiconductor element on said bottom surface;
input and output terminals connected to said circuit and penetrating through said first pair of opposite side walls of said container;
wherein said bottom surface includes a main space for mounting said radio frequency semiconductor circuit in the middle portion of the rectangular frame with respect to the direction parallel to the first pair of side walls and a supplementary space for mounting elements of a supplementary circuit in the end portions of the rectangular frame positioned to the side of said middle portion thereof;




a cap covering said container; and
metallic projection means formed inwardly and integral with said second pair of side walls, said projection means extending between said cap and said bottom surface and being disposed within said supplementary space to narrow the cross-section of the container in a direction parallel to said first pair of side walls thereby reducing the effective length of said container to reduce the cutoff wavelength thereof and thus increase the cutoff frequency thereof, wherein at least a portion of said supplementary space is formed to the side of each projection means.

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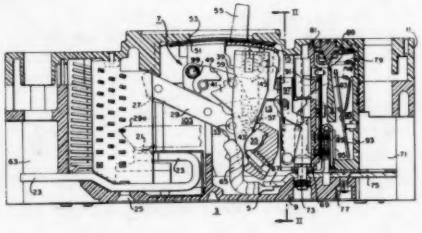
**4,713,635**

## MULTI-PHASE CIRCUIT BREAKER WITH INTERPHASE BARRIER RETENTION

**Robert H. Flick, Brighton Township, Beaver County; Lawrence D. Dennis, North Fayette Township, Allegheny County, and Roger E. Walker, Franklin Township, Beaver County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jul. 1, 1986, Ser. No. 880,764**
**Int. Cl.[4] H01H** *75/00, 77/00, 83/00*
**U.S. Cl. 335—8** **3 Claims**




1. A multi-phase circuit breaker comprising:
a housing having a detachable cover;
a plurality of barriers separating the housing into isolated phase compartments;
a circuit breaker structure within each compartment and having a pair of contacts operable to open and close an electric circuit;
manually operable means for opening and closing the

contacts simultaneously in the compartments and including a crossbar extending transversely of the compartments and through the barriers;

each barrier comprising first and second barrier portions, the first barrier portion being detachably mounted and having surfaces forming a crossbar-receiving opening and supporting the crossbar; and

each second barrier portion being an integral part of the cover and being aligned and in abutment with a corresponding first barrier portion when the cover is mounted on the housing.

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**4,713,636**

## CIRCUIT-BREAKER

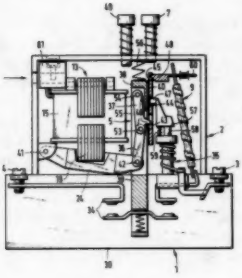
**Helmut Lemmer, Marienheide-Kalsbach, and Josef Risthaus, Gummersbach, both of Fed. Rep. of Germany, assignors to Square D Starkstrom GmbH, Fed. Rep. of Germany**

**Filed Jul. 23, 1986, Ser. No. 888,422**

**Claims priority, application European Pat. Off., Mar. 21, 1986, 86103894.1**

**Int. Cl.**[4] **H01H** *77/00, 83/00, 81/00*

**U.S. Cl. 335—35** **19 Claims**



1. A circuit-breaker comprising a housing having an end, an actuator device positioned upon said end, thermal trippers and magnetic trippers mounted on one side of said actuator device, means for operationally connecting said thermal and magnetic trippers relative to said actuator device, an electromagnetic drive including an armature, said electromagnetic drive being mounted on a second side of said actuator device opposite said one side, a set of contacts adjacent said end, said set of contacts being operable through said thermal and magnetic tripper connecting means, a pair of pivotally connected links, means for connecting said pair of links between said armature and said thermal and magnetic tripper connecting means, a slider mounted adjacent and movable relative to said thermal and magnetic tripper connecting means, means for selectively engaging and disengaging said links relative to said slider, and means for connecting said thermal and magnetic trippers to said slider.

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**4,713,637**

## STORED ENERGY CIRCUIT BREAKER WITH RATCHET MECHANISM FOR CHARGING A CONTACT CLOSING SPRING

**Alfred E. Maier, Chippewa, Pa.; David A. Leone, Lawrenceville, Ga., and Louis N. Ricci, Chippewa Township, Beaver County, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Sep. 30, 1986, Ser. No. 913,880**

**Int. Cl.**[4] **H01H** *3/00, 9/00, 51/00*

**U.S. Cl. 335—76** **4 Claims**

1. A circuit breaker comprising:

a pair of contacts operable between open and closed positions;

a crankshaft supported for rotational movement;

closing spring means connected to the crankshaft;

a ratchet wheel mounted on the crankshaft for advancing the crankshaft;

driving connection means between the ratchet wheel and the crankshaft;

an oscillating drive wheel coupled with the ratchet wheel and movable between advanced and retracted positions for advancing the ratchet wheel;

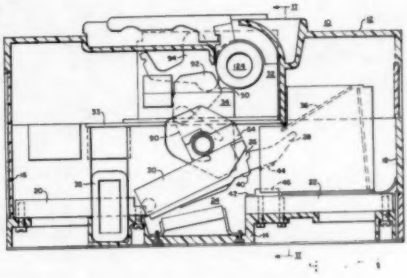
the ratchet wheel and the drive wheel having reciprocating interengaging parts for advancing the ratchet wheel;

brake means coupled with the crankshaft to prevent retraction of the crankshaft when the drive wheel is retracted;

operating means for advancing the ratchet wheel through the driving connection means to rotate the crankshaft from a spring discharged position to a spring charged position to charge the closing spring means;

the closing spring means being dischargeable to actuate the contacts to the closed position;

spring means biasing the drive wheel against the ratchet wheel whereby to engage the reciprocating interengaging parts when the operating means is advanced and enable disengagement of said parts when the operating means is retracted;



the brake means including a brake wheel mounted on the drive shaft and the ratchet wheel and brake wheel having reciprocating interengaging parts for preventing rotation of the crankshaft;

the brake wheel and the drive wheel being disposed in opposite sides of the ratchet wheel;

the operating means including a manual handle structure having a housing surrounding the assembly of the wheels and drive shaft and having a handle extending from the housing;

the operating means includes a motorized drive having an output shaft and a wheel assembly including a motor driven drive wheel and a driven ratchet wheel;

the reciprocating interengaging parts including a first lateral portion projecting from one side of one of the drive wheel and the ratchet wheel and a lateral-portion receiving hole in the other of the drive wheel and ratchet wheel, a second lateral portion projecting from one side of one of the brake wheel and the ratchet wheel and a second lateral-portion receiving hole in the other of the brake wheel and the ratchet wheel, and spring means biasing the drive wheel and brake wheel against the ratchet wheel so as to enable engagement of the lateral-portions with the holes.

4,713,638

## POLARIZED ELECTROMAGNETIC RELAY

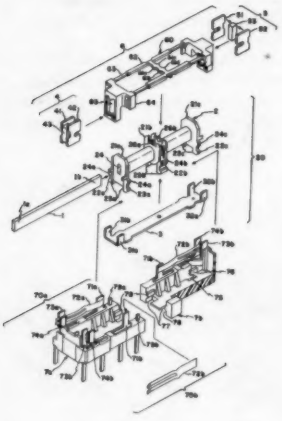
Yuichi Kamo, and Nobuo Mikami, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Oct. 24, 1986, Ser. No. 923,087

Claims priority, application Japan, Oct. 25, 1985, 60-164274[U]; Oct. 25, 1985, 60-164275[U]; Oct. 25, 1985, 60-164276[U]; May 19, 1986, 61-115603; May 19, 1986, 61-75761[U]

Int. Cl.[4] H01H *51/22*

U.S. Cl. 335—79 20 Claims



1. A polarized electromagnetic relay comprising:

a movable block including a pair of permanent magnet units, each of said units being composed of a permanent magnet and a pair of generally U-shaped magnetic plates attached to opposite magnetic poles of said permanent magnet, respectively, each of said magnetic plates having a first end and a second end, said first end and said second end of each of said magnetic plates being opposed when attached to the poles of said permanent magnet, respectively, and a supporting member for supporting said permanent magnet units at its opposite ends, respectively, said supporting member actuating contact members responsive to movements of said permanent magnet units;

a core having opposite ends placed between the first ends of said magnetic plates, respectively;

a yoke having opposite ends, each of said opposite yoke ends being formed by a pair of opposing end pieces, the second ends of said magnetic plates being arranged in spaces, each of said spaces being defined by said opposing end pieces, respectively;

a spool including a longitudinal through-hole through which said core is inserted, flanges formed at opposite ends and a center portion of said spool, respectively, a plurality of protrusions protruding outwardly from both sides of each of said flanges, and a coil wound around said spool; and

a pair of base members, each of said base members having groove and recesses for receiving the protrusions of said flanges of said spool, protrusions formed on side surfaces of inner walls of said base member for engaging the protrusions of said spool at the end of a longitudinal movement of the base member and contact members responsive to said movable block, said base members being assembled onto said spool from both ends thereof.

4,713,639

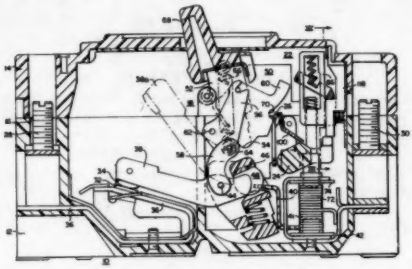
## CIRCUIT BREAKER WITH PUSH-TO-TRIP BUTTON AND TRIP BAR

Kurt A. Grunert, Beaver, and Donald E. Schlosser, Beaver Falls, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 20, 1987, Ser. No. 17,304

Int. Cl.[4] H01H *9/00*

U.S. Cl. 335—172 5 Claims



1. A circuit breaker comprising:

a pair of separable contacts including a movable contact;

a movable contact arm carrying the movable contact and movable between open and closed positions of the contacts;

an operable mechanism for actuating the contact arm and comprising a pivotally supported releasable member;

latching means for latching the releasable member and including a latch lever movable between latched and unlatched positions of the releasable member;

trip means including a trip bar for releasably holding the latch lever in the latched position;

the trip bar being movable between tripped and untripped positions;

trip delay means for avoiding premature unlatching of the trip bar and including a body movable against the trip bar and biased away therefrom;

a manually operated trip button having a first surface in contact with the trip bar;

the trip delay means having an adjustment bar biased against the body for applying a prescribed pressure on the body; and

the adjustment bar having a second surface in contact with the trip button for holding the first surface in contact with the trip bar.

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4,713,640

## MOLDED-CASE CIRCUIT BREAKER WITH IMPROVED CONTACT ARM ASSEMBLY, TOGGLE LINK MEANS AND ARC SHIELD COMPONENT

Glenn L. Murphy, Oxford; Russell T. Borona, Seymour, and Francis L. Gelzheiser, Fairfield, all of Conn., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 22, 1986, Ser. No. 944,137

Int. Cl.[4] H01H *3/00*

U.S. Cl. 335—194 6 Claims

1. In combination with a circuit breaker having a stationary contact, a movable contact carried by an elongated contact arm, a trip assembly, a spring-biased operating mechanism, and a toggle assembly for swinging the contact arm and movable contact away from the stationary contact when the trip assembly is actuated and thereby rapidly separating said contacts, an improved mount assembly for said contact arm comprising;

a pair of spaced upstanding support members within the circuit breaker holding the trip assembly, operating mechanism, toggle assembly and contact arm in operative relationship,

a pivot shaft rotatably coupled to said support members and

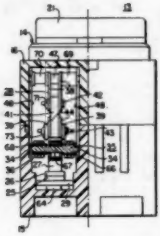
extending laterally therebetween and through an opening in said contact arm,

a pair of spacer members on said pivot shaft interposed between the side surfaces of said contact arm and the respective support members and maintaining said contact arm in predetermined spaced-apart relationship with said support members so that said contact arm and movable contact are swingable along a fixed predetermined arcuate path toward and away from the stationary contact when the circuit breaker is tripped and subsequently reset,

said pair of support members comprising a pair of plates each having an aperture therein that are substantially aligned with one another,

said pivot shaft terminating at each by an end segment that is seated in snug-fitting rotatable relationship with the apertured portion of the associated support plate,

one of said spacer members comprising an integral part of said pivot shaft,



the other of said spacer members comprises a sleeve that is in slip-fitted encircling relationship with said pivot shaft at a location remote from the integral spacer portion thereof,

the apertures in said support plates are of substantially circular configuration,

the end segments of said pivot shaft are of substantially cylindrical configuration,

the medial segment of said shaft is also of substantially cylindrical configuration and has a diameter larger than the diameters of the cylindrical end segments, and

said spacer sleeve and integral spacer portion of said pivot shaft are also of substantially cylindrical configuration and of substantially the same diameter and length so that the contact arm is centrally located between said support plates, the diameter of said spacer sleeve and the integral spacer portion of said pivot shaft being larger than the diameter of the medial segment of said pivot shaft.

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**4,713,641**

## ELECTROMAGNETIC DEFLECTION UNIT

**Anwar Osseyran; Jacobus J. M. Van De Meerakker, both of Eindhoven; Harmen Van Der Meulen, Veldhoven, and Halbe Osinga, Eindhoven, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Mar. 30, 1987, Ser. No. 32,421**

**Claims priority, application Netherlands, Apr. 14, 1986, 8600933**

**Int. Cl.[4] H01F** *5/02*

**U.S. Cl. 335—213** **1 Claim**

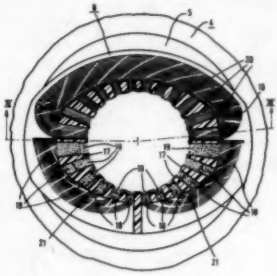
1. An improved electromagnetic deflection unit for a cathode-ray tube, such deflection unit comprising:

a hollow annular support provided with a narrow end and a wide end and with a longitudinal axis;

respective flanges at the narrow end and the wide end of the support, each flange having at least one tangential groove with a bottom portion and a plurality of mainly radial grooves merging into a said tangential groove, the radial grooves in at least the flange at the narrow end each having a longitudinally extending portion of predetermined width and depth, which longitudinally extending portions are tangent to an inscribed circle;

a first set of deflection coils for line deflection of an electron beam in a first direction transverse to said longitudinal axis, such deflection coils being wound directly onto said support on the inner surface thereof and the turns thereof traversing each of the tangential grooves and radial grooves of the flanges; and

a second set of deflection coils for field deflection of said electron beam in a second direction traverse to said longitudinal axis and transverse to said first direction, such deflection coils being wound directly onto the support and the turns thereof traversing said radial grooves in the flange, said improvement being characterized in that in the flange at the narrow end of said support:



the width and the depth of said longitudinally extending portion of each of said radial grooves are chosen so that the turns traversing these grooves substantially fill such portions of said grooves; and

said bottom portions of said tangential grooves are located on the surface of an oval cylinder.

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**4,713,642**

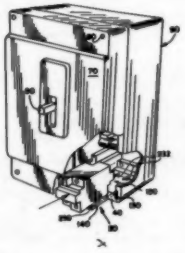
## FACE CONNECTED INSTRUMENT TRANSFORMER

**William R. Wolfe, Mt. Lebanon, and David Marschik, Wilkins Township, Allegheny County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed May 7, 1986, Ser. No. 860,711**

**Int. Cl.[4] H01F** *27/04, 29/02*

**U.S. Cl. 336—92** **15 Claims**



1. An instrument transformer having a plurality of transformation ratios for connection to at least one external circuit comprising:

an elongated housing having at least one face with a plurality of longitudinally offset surfaces;

a plurality of pairs of first circuit terminals disposed adjacent different ones of said surfaces such that each pair of said first circuit terminals is coplanar and longitudinally offset from each other pair of terminals;

a plurality of first circuit windings disposed within said

housing, each winding electrically connected to one pair of said first circuit terminals;

one or more pairs of second circuit terminals disposed exteriorly on said housing;

one or more second circuit windings positioned within said housing in magnetic coupling relationship with at least one of said first circuit windings and electrically connected to said one or more pairs of second circuit terminals.

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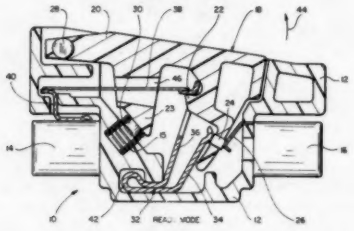
**4,713,643**

## LOW LOSS CIRCUIT BREAKER AND ACTUATOR MECHANISM THEREFOR

**Samuel Baum, Redwood City, and John R. Yaeger, Sunnyvale, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.**

**Filed Dec. 23, 1986, Ser. No. 945,927**
**Int. Cl.[4] H01H *71/16***
**U.S. Cl. 337—140** **10 Claims**



1. An actuator mechanism comprising:

a pivotable arm having a latching portion and a contact portion;

a means for biasing exerting a biasing force with respect to said pivotable arm;

a bifurcated member having a contact arm in touching relationship with the contact portion of said pivotable arm and a flexure arm cooperating with the latching portion of said pivotable arm, the flexure arm releasably restraining said pivotable arm against the biasing force exerted by said biasing means; and

a shape memory alloy element operatively connected to the flexure arm wherein when said element is heated, said element cooperates with the flexure arm to remove the restraining of said pivotable arm, thereby releasing said pivotable arm to pivot and break the touching relationship of the contact portion and the contact arm.

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**4,713,644**

## VACUUM FUSE

**William H. Nash, South Milwaukee, and Eugene C. Fowler, Milwaukee, both of Wis., assignors to Cooper Industries, Inc., Houston, Tex.**

**Filed Oct. 14, 1986, Ser. No. 918,238**
**Int. Cl.[4] H01H *85/04***
**U.S. Cl. 337—158** **7 Claims**

1. A vacuum fuse comprising,

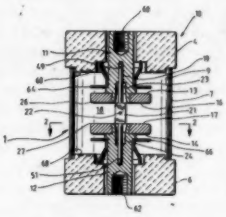
means defining first and second spaced, generally parallel, confronting arcing surfaces arranged in general registry with each other,

fusible element means connected to and bridging the space between said arcing surfaces,

first and second electrically conductive contact rods electrically connected to said fusible element means and said arcing surfaces and projecting oppositely relative to the space between said arcing surfaces, a metallic, generally cylindrical housing member enclosing the space between said arcing surfaces,

end plates of an insulating material axially aligned with and capping said housing member, said contact rods terminating substantially flush with said end plate,

and means providing a seal connection between said housing member, and said end plates and between end plates and



said contact rods so that the interior of said housing in which said arcing surfaces are arranged is sealed, said interior being open between said housing and arcing surfaces.

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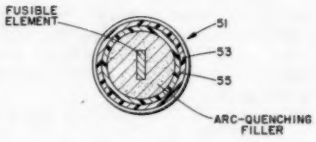
**4,713,645**

## FIBER REINFORCED PRODUCTS AND METHOD FOR PRODUCING SAME

**Fereidoon Razavi, Richmond Heights, Ohio, assignor to Monogram Industries, Inc., Providence, R.I.**

**Filed Jun. 24, 1985, Ser. No. 747,994**
**Int. Cl.[4] H01H *85/02, 85/14***
**U.S. Cl. 337—246** **12 Claims**




1. An electric fuse comprising:

a fusible element;

an arc-quenching means surrounding said fusible element; and

a casing of scrim-mat laminate housing said fusible element and said arc-quenching means, said casing comprising:

a first tubular layer composed of glass fiber scrim comprised of two groups of generally parallel lengths of glass fiber, the lengths of the respective groups intersecting and defining openings therebetween, said first layer having an inner surface and an outer surface; and

a second tubular layer composed of glass fiber mat, said second layer having an inner surface and an outer surface;

the inner surface of one of said first and second tubular layers being engaged with and bonded to the outer surface of the other of said tubular layers by a resin therebetween.

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**4,713,646**

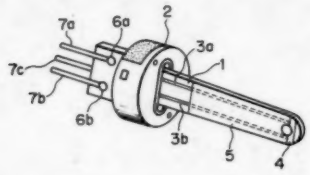
## GAS SENSOR AND METHOD OF PRODUCING THE SAME

**Naomasa Sunano, Akashi; Naotatsu Asahi, Katsuta, and Toshio Yoshida, Kasukabe, all of Japan, assignors to Shinyei Kaisha, Hyogo and Hitachi, Ltd., Tokyo, both of, Japan**

**Filed Jun. 24, 1985, Ser. No. 748,198**
**Int. Cl.[4] H01L *7/00***
**U.S. Cl. 338—34** **26 Claims**

1. In a gas sensor comprising a pair of electrodes juxtaposed with each other on an electrically insulating substrate, a sensitive layer interposed electrically between said electrodes at

their one ends, and a protective film covering a part of said sensitive layer and a part of each of said electrodes, the improvement wherein said sensitive layer is a titanium oxide layer formed by spraying titanium oxide on said substrate at a high




temperature, wherein a diffusion reactive layer is provided between said titanium oxide layer and said substrate, and wherein the titanium oxide layer has fine grooves or pores in its surface portion.

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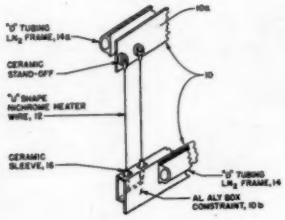
**4,713,647**

## THERMAL VACUUM HEATER ARRAY APPARATUS

**John E. Allen, Westminster; John D. Glover, Tustin, both of Calif., and Clayton C. Shepherd, Jr., Newport News, Va., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Apr. 1, 1986, Ser. No. 846,691**
**Int. Cl.[4] H01C *10/10, 10/16***
**U.S. Cl. 338—316** **7 Claims**




1. A thermal vacuum heater array apparatus comprising in combination:

a support frame having an upper and lower support member,

a plurality of heater wires attached to said upper support member, said plurality of heater wires being electrically isolated from said upper support member, said plurality of heater wires having a predetermined diameter to prevent buckling, each wire of said plurality of heater wires being linearly positioned with respect to each other along said upper support member, each wire being substantially U-shaped, both ends of wire being attached to said upper support member, the U-shape portion of said wire passing through openings in said lower support member, said U-shape portion of said wire including an electrical isolation means to prevent electrical contact between said wire and said lower support member, and

means for cooling operatively connected to said support frame for cooling said heater array apparatus.

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**4,713,648**

## VEHICLE RECORDING SYSTEM

**Hugh A. McSweeney, P.O. Box 389, Malakoff, Tex. 75148**

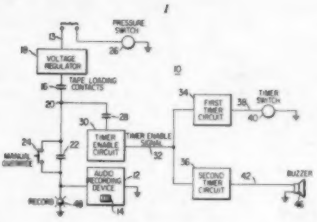
**Filed Sep. 20, 1985, Ser. No. 778,223**
**Int. Cl.[4] B60Q *1/00***
**U.S. Cl. 340—52 D** **14 Claims**

1. A recording system for a vehicle having an engine, comprising:

an audio recording device for receiving a tape cartridge on which spoken messages are recorded;

a pressure switch mounted in the engine and responsive to pressure changes therein for generating a control signal at a predetermined engine operating condition;

means responsive to the control signal for generating a timer enable signal;




first timer means activated by the timer enable signal to generate a first timing signal over a first predetermined period; and

means responsive to the first timing signal over the first predetermined time period for activating the audio recording device to record any spoken message.

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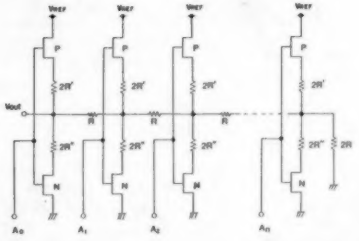
**4,713,649**

## BIAS VOLTAGE COMPENSATED INTEGRATED CIRCUIT DIGITAL-TO-ANALOG CONVERTER

**Youzi Hino, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Filed Apr. 2, 1986, Ser. No. 847,093**
**Claims priority, application Japan, Dec. 29, 1982, 57-233909**
**Int. Cl.[4] H03M *1/66***
**U.S. Cl. 340—347 DA** **13 Claims**




8. An integrated circuit digital-to-analog converter, comprising:

a substrate receiving a bias voltage;

a resistor network formed on said substrate and comprising network resistors operatively connected in series and forming connection points therebetween, each network resistor having a resistivity varying in accordance with the applied bias voltage;

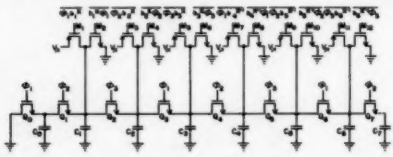
a termination resistor formed on said substrate and operatively connected to one end of said resistor network; and

switching and compensation means, formed on said substrate and operatively connected to the other end of said resistor network and to the connection points of said resistor network, for receiving a digital signal and converting the digital signal to voltages applied to said resistor network, the voltages compensating for the variance in the resistivity of the network resistors caused by said bias voltage.

## 4,713,650
## PIPELINED DIGITAL-TO-ANALOG CONVERTER

Gabor C. Temes, and Fong J. Wang, both of Los Angeles, Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 24, 1986, Ser. No. 922,658
Int. Cl.[4] H03M 1/66
U.S. Cl. 340—347 DA 2 Claims



1. A digital to analog converter comprising:

a plurality of capacitor and transistor switch sections, each of said sections for converting three digits of a binary digital signal to an output analog voltage, each of said sections comprising:

first, second, and third pairs of input switching transistors, wherein the first transistor in each said pair is enabled and transfers a predetermined reference voltage only in response to a logic one in the input binary digit, while the second transistor in each said pair is enabled and thus transfers a ground voltage only in response to a logic zero in the same input binary digit,

first, second, and third output switching transistors coupled to said first, second, and third pairs of input switching transistors and responsive to first, second, and third independent and non-overlapping enabling signals, and

first, second, and third equal size capacitors coupled to said first, second, and third output switching transistors and to ground potential, wherein said first, second, and third capacitors are selectively connected to said ground potential or said reference or ground voltage from said input pairs of switching transistors in response to said applied binary digits, said enabling signals being sequentially applied to said first, second, and third output switching means to discharge said capacitors and combine stored charges thereon, such that an analog voltage representative of said applied digital signal is produced and selectively moved from said capacitor to capacitor from the least significant bits to the most significant bits in said applied digital signal.

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## 4,713,651
## INFORMATION DISPLAY SYSTEM

Meir Morag, 21 Shalom Asch Street, Tel Aviv, Israel

Filed Mar. 24, 1986, Ser. No. 843,079
Claims priority, application Israel, Mar. 29, 1985, 74762
Int. Cl.[4] G08B 23/00
U.S. Cl. 340—407 5 Claims

1. An information display system for providing event and direction indication information to an operator, comprising:

means for receiving information signals having event and direction indication characteristics;

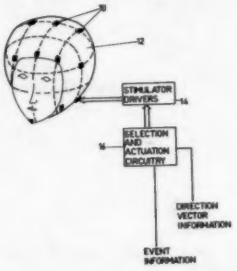
means for transforming said received information signals into direction indications in a fixed reference coordinate system;

an egocentric coordinate system centered in the head of the operator, and wherein spatial orientation of said egocentric coordinate system varies with spatial orientation of the head of the operator;

means for transforming said direction indications in said fixed reference coordinate system to direction unit vectors in said egocentric coordinate system;

a plurality of tactiel stimulators associated with the head of the operator to provide selected tactile stimuli thereto, and wherein said plurality of tactile stimulators are statically disposed generally omnidirectionally in 360 degree space about said egocentric coordinate system centered in the head of the operator and

means responsive to said direction unit vectors in said egocentric coordinate system for actuating selected ones of said plurality of tactile stimulators at locations on the head




of the operator corresponding to said event and direciton indication characteristic of said received information signals, thereby providing the operator with selected tactile stimuli corresponding to said event and direction indication information.

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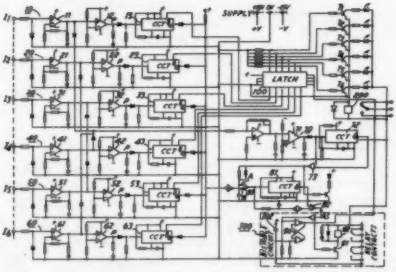
## 4,713,652
## ELECTRICAL APPARATUS

Steven J. French, Coventry, and David L. Neasham, Penkridge, both of England, assignors to Thorn Emi Electronics Limited, Hayes, England

Filed Nov. 19, 1985, Ser. No. 799,643
Claims priority, application United Kingdom, Nov. 22, 1984, 8429487
Int. Cl.[4] G08B 21/00
U.S. Cl. 340—652 17 Claims



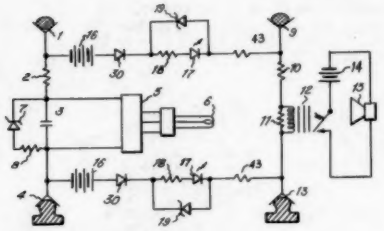
1. An electrical apparatus suitable for monitoring electrical continuity of the input arms of a rectifier circuit, the apparatus comprising a plurality of pulse generating means, each being associated with a respective input arm of the rectifier circuit and generating a succession of electrical pulses while an electrical signal prevails in said input arm, and

a plurality of first timing circuits, each being associated with a respective input arm of the rectifier circuit and generating a respective first electrical signal provided an interruption of a respective succession of electrical pulses persists for a first part of a preset interval of time, and a second timing circuit, being responsive to a said first electrical signal generated by any of said plurality of first timing circuits, to initiate an alarm signal provided said interruption persists for the remainder of said preset interva of time.

## 4,713,653
## HIGH VOLTAGE PROTECTOR

Julian A. McDermott, Ridgewood, N.Y., assignor to Julian A. McDermott Corp., Ridgewood, N.Y.

Continuation of Ser. No. 428,496, Sep. 29, 1982, abandoned. This application Oct. 28, 1985, Ser. No. 792,183
Int. Cl.[4] G08B 21/00
U.S. Cl. 340—654 9 Claims



1. Apparatus for warning that an exposed member carrying high voltage is live, which comprises means for providing a first alarm when electrical energy is applied thereto, sensing means connecting said alarm providing means to said high voltage member and to a member at return potential to apply electrical energy to said alarm providing means from said high voltage member thereby causing operation of said first alarm providing means when said high voltage member is live, said sensing means including contactor means attachable to said high voltage member and to said member at return potential and having a means for providing a pair of connections to said high voltage member, means for providing a second alarm depending upon whether a circuit therethrough is completed for verifying the connection of said first alarm providing means to said high voltage member, one of said pair of connections being connected in common to said first alarm providing means and to said second alarm providing means, the other of said pair of connections being connected to said second alarm providing means to complete said circuit therethrough when both of said pair of connections are connected to said high voltage member, said contactor means including means for providing a second pair of connections to said member at return potential, means for providing a third alarm when a circuit therethrough is completed, and means connecting said third alarm providing means to said second pair of connections for completing said circuit therethrough when both connections of said second pair of connections are connected to said return potential member for verifying the connection of said first alarm providing means thereto.

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## 4,713,654
## SHAFT SPEED MONITOR

Ralph S. Sweany, R.R. 2, Box 616, Crothersville, Ind. 47229

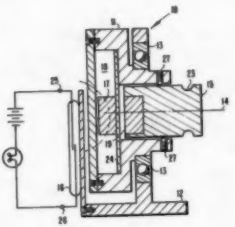
Filed Mar. 3, 1986, Ser. No. 835,253
Int. Cl.[4] G01B 21/00
U.S. Cl. 340—671 12 Claims

1. A shaft speed monitor for warning of an undesired velocity condition in a rotating shaft having an axis of rotation, comprising:

magnetic means for establishing an actuating magnetic field, the poles of said magnetic means defining an axis of magnetic polarity;

an electrical switch having alternate open and closed states, said switch being responsive to the actuating magnetic field and cooperating therewith to define on and off spatial domains wherein said switch is on when said magnetic means is oriented within an on-domain and said switch is off when said magnetic means is oriented within an off-domain;

mounting means for mounting and orienting said magnetic means and said electrical switch with respect to said shaft to permit displacement by centrifugal force, generated by the rotation of said shaft, of the magnetic means with respect to the electrical switch such that said magnetic means can pass from within an on-domain to within an off-domain, in which the axis of magnetic polarity of said magnetic means is parallel to the axis of rotation of said shaft;



bias means for biasing said magnetic means within an on-domain when the shaft is at rest and for resisting displacement thereof by centrifugal force; and

electrically operated output means operatively connected to said electrical switch for generating an output signal representative of the on-off condition of said switch.

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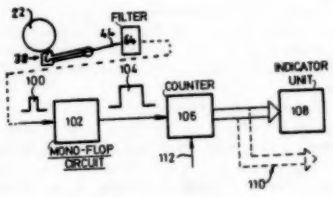
## 4,713,655
## METHOD OF MONITORING THE QUALITY OF A PACKAGE OF THREAD

Hans-Jorg Sommer, Zurich; Heinz Mutter, Winterthur; Armin Wirz, Ossingen, and Felix Graf, Winterthur, all of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Jun. 18, 1985, Ser. No. 745,885
Int. Cl.[4] G08B 21/00
U.S. Cl. 340—677 12 Claims




1. A method of monitoring the quality of a package of thread during package formation, said method comprising the steps of

passing a thread through a predetermined thread path to form a thread package;

sensing a projection of thread beyond said predetermined path at a sensing location maintained at a predetermined spacing from said path at the thread package continuously during forming of the package;

producing an output signal in response to each sensing of a projection of thread at said location;

processing each output signal to produce a corresponding logic signal; and

logic processing the logic signals produced during formation of a package of thread to provide an indication of the quality of the package.

## 4,713,656

## MULTI-PROGRAMMED DATA PROCESSING SYSTEM WITH FACILITY FOR INSPECTING STATE OF BACKGROUND PROGRAM

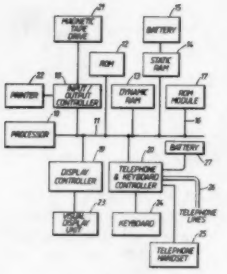
John F. Cliff, Bracknell, and Robert R. Walton, Woking, both of England, assignors to International Computers Limited, London, England

Filed Oct. 21, 1985, Ser. No. 789,323

Claims priority, application United Kingdom, Nov. 10, 1984, 8428443

Int. Cl.[4] G06F *3/14*

U.S. Cl. 340—723 6 Claims




1. A data processing system comprising:

(a) means for executing a plurality of programs concurrently,

(b) a display screen for displaying data associated with any one of the programs,

(c) means for allocating any one of the programs to a foreground mode in which it is allowed to access the display screen and for allocating the other programs to a background mode in which they are not allowed to access the display screen,

(d) means for maintaining, in respect of each of the programs currently in the background mode, display screen data indicating the current status of that program,

(e) means for maintaining a review menu containing a list of those programs currently having display screen data available,

(f) a manually operable review key,

(g) means responsive to operation of the review key to cause said review menu to be displayed on the screen in place of information from the program currently in the foreground mode,

(h) manually operable selection means,

(i) means responsive to operation of said selection means when the review menu is being displayed, to select one of the programs listed on that menu and to cause the display screen data of the selected program to be displayed on the screen for as long as said selection means is operated, and

(j) means responsive to release of said manually operable selection means to restore to the screen the information from the program currently in the foreground mode.

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## 4,713,657

## SYSTEM FOR INCREASING THE BRIGHTNESS OF A MULTIBEAM DOT-PATTERN CATHODE RAY DISPLAY TUBE

Alessandro Tischer, Saronno, Italy, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 457,294, Jan. 11, 1983, abandoned. This application Apr. 21, 1986, Ser. No. 856,842

Int. Cl.[4] G09G *1/00*

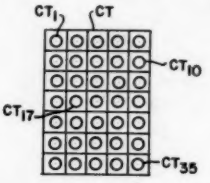
U.S. Cl. 340—748 7 Claims

1. A system for forming an image from a pattern of excited dots on a cathode ray tube luminescent screen, said dots being excited by a plurality of electron beams produced within the display tube, said system comprising:

(a) an electron beam source including a two-dimensional array of electron beam emitters for producing respective ones of said electron beams, each emitter being selectively energizable;

(b) horizontal deflection means for repeatedly horizontally deflecting the electron beams in a first direction at a predefined rate of repetition;

(c) selection means for simultaneously energizing a selected pattern of the electron beam emitters corresponding to a




portion of the pattern of excited dots on the luminescent screen to which the beams are instantaneously deflected, said selection means effecting horizontal shifting of the selected pattern of electron beam emitters, in a direction opposite to said first directoin, synchronously with the horizontal deflection of the beams in said first direction, thereby maintaining a stationary image on the luminescent screen; and

(d) vertical deflection means for vertically deflecting the electron beams after said beams have been horizontally deflected a predetermined number of times to repeatedly form said portion of the image.

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## 4,713,658

## APPARATUS FOR PROVIDING A VISUAL INTERPRETATION OF AN AUDIO SIGNAL

Andrew D. Swinton, 24D Cricket Ground Road, Norwich, United Kingdom

Filed Jul. 5, 1985, Ser. No. 752,361

Int. Cl.[4] G08B *5/22*

U.S. Cl. 340—815.11 8 Claims

1. Apparatus for providing a visual interpretation of an audio signal, comprising:

(a) an electronic analyzer including means to analyze an audio signal into a plurality of frequency components and to produce, for each frequency component, an electric signal representative of that component of the audio signal,

(b) a plurality of inductive motors associated at least one with each of said components,

(c) a plurality of shafts, each carrying visible indicator means drivably coupled at least one to each of said motors,

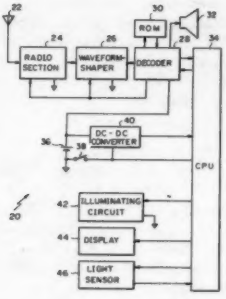
(d) means mounting said shafts whereby each shaft is rotatable independently of each other shaft, and

(e) motor control means between the electronic analyzer and each of said motors whereby each motor is operable independently of each other motor, and controlled by respective ones of said frequency component electric signals.

## 4,713,659
## PAGER WITH DISPLAY

Takashi Oyagi, and Kazuyuki Tsunoda, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Jul. 12, 1985, Ser. No. 754,112
Claims priority, application Japan, Jul. 18, 1984, 59-150421
Int. Cl.[4] G09G 3/18
U.S. Cl. 340—825.44 26 Claims

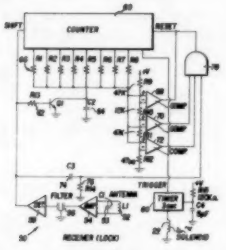



20. A pager, comprising:
display means for displaying a message;
means for sensing an external luminance level in the vicinity of said display means;
means for illuminating said display means when said message is being displayed on said display means and the sensed external luminance level falls below a predetermined level; and
control means for deactivating said sensing means for a predetermined time after the sensed external luminance level falls below said predetermined level.

## 4,713,660
## ELECTRONIC PROXIMITY KEY AND LOCK

Hans R. Camenzind, 166 Hawthorne Ave., Los Altos, Calif. 94022

Continuation-in-part of Ser. No. 763,333, Aug. 6, 1985, abandoned. This application Aug. 14, 1986, Ser. No. 896,591
Int. Cl.[4] H04Q 1/00
U.S. Cl. 340—825.69 14 Claims

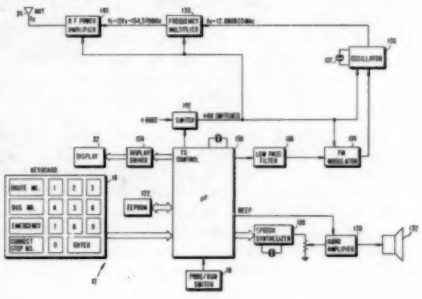



1. An electronic key and lock system comprising: a key means comprising:
a first plurality of different resistive means;
means for generating a first signal having a plurality of different timing periods with each timing period determined by one of said resistive means; and
means for transmitting said first signal; and a lock means comprising:
a lock;
means for receiving said first signal;
a first charging means responsive to said received first signal;
a second plurality of different resistive means connected with one conection in common and being selectively activable by said charging means;
a first capacitor, said capacitor connected in series to said plurality of resistive means at the common connection and being charged by said charging means through one of said plurality of resistive means;
first discharging means for discharging said capacitor;
first comparing means connected to the junction of said second plurality of resistive means and said capacitor for comparing each consecutive timing period of said first signal with the timing period determined by a different one of said second plurality of resistive means; and
means for activating said lock in the event the consecutive timing period of said first signal match the timing periods determined by said second plurality of different resistive means.

## 4,713,661
## TRANSPORTATION VEHICLE LOCATION MONITOR GENERATING UNIQUE AUDIBLE MESSAGES

Joseph E. Boone, and W. Bruce Ahlemeyer, both of Indianapolis, Ind., assignors to Regency Electronics, Inc., Indianapolis, Ind.

Filed Aug. 16, 1985, Ser. No. 766,607
Int. Cl.[4] G08G 1/12
U.S. Cl. 340—994 9 Claims




1. An apparatus for monitoring the location of a vehicle on a transportation route having a plurality of stops from a location proximate to a stop designated for said apparatus, said apparatus comprising:
(a) memory means for storing data corresponding to said designated stop and for storing initial stop data corresponding to a preselected stop prior to said designated stop on said route;
(b) receiver means for receiving and demodulating a modulated RF signal containing current stop data representing the current location of said vehicle;
(c) alert signal generating means for generating a unique alert signal for each stop between said preselected stop and said designated stop on said transportation route, said alert signal generating means including means for detecting current stop data which corresponds with said initial stop data and current stop data which corresponds with said designated stop data;
(d) a speech synthesizer, said speech synthesizer including means responsive to each unique alert signal for synthesizing a corresponding unique audio message;
(e) a speaker coupled to an output of said speech synthesizer;
wherein said receiver means is operative to receive and demodulate a modulated RF signal containing programming data which include said initial and designated stop data;
(f) means for coupling said current stop data and said initial and designated stop data from said receiver means to said memory means;

(g) means for accessing a current bus number, route number, and stop number in said current stop data and for accessing a bus number, first route number, initial stop number, and designated stop number in said programming data;

wherein said alert signal generating means generates a first unique alert signal if said current bus number, route number, and stop number match said bus number, first route number, and initial stop number, respectively, in said programming data, and generates a second unique alert signal if said current bus number, route number, and stop number match said bus number, first route number, and designated stop number, respectively, in said programming data;

(h) means for accessing a second route number, second initial stop number, and second designated stop number in said programming data;

wherein said alert signal generating means alternatively generates said first alert signal if said current bus number, route number, and stop number match said bus number, second route number, and second inital stop number, respectively, in said programming data, and alternatively generates said second alert signal if said current bus number, route number, and stop number match said bus number, second route number, and second designated stop number, respectively, in said programming data;

(i) means for identifying first, second, and third programming data words in said received programming data;

(j) means for interpreting first and second sequentially received portions of said first programming data word as a system number and a serial number, respectively;

(k) means for interpreting first, second, and third sequentially received portions of said second programming data word as said first route number, said second route number, and said bus number in said programming data, respectively; and

(l) means for interpreting first, second, third, and fourth sequentially received portions of said third programming data word as said initial stop number for said first route number, said designated stop number for said first route number, said initial stop number for said second route number, and said designated stop number for said second route number, respectively.

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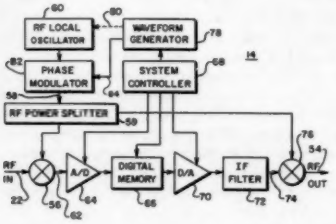
**4,713,662**

## MODULATED DIGITAL RADIO FREQUENCY MEMORY

**Richard J. Wiegand, Severna Park, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Oct. 17, 1986, Ser. No. 919,942**
**Int. Cl.[4] G01S *7/38***
**U.S. Cl. 342—13** **13 Claims**




1. A modulated digital radio frequency memory suitable for use as a coherent radio frequency memory in a military electronic countermeasure system, said memory comprising:

an RF local oscillator;

means for modulating the signal from said local oscillator;

a first mixer for converting an RF input signal and the modulated local oscillator signal into an IF signal;

an A/D converter for converting said IF signal into digital values;

digital memory means for storing said digital values for later retrieval;

a D/A converter for converting retrieved digital values into an analog signal;

an IF filter for filtering said analog signal;

a second mixer for converting the filtered analog signal and said modulated local oscillator signal into an RF output signal; and

means for controlling the modulating and memory means such that the modulation on the local oscillator signal which is applied to the second mixer when specific digital values are being retrieved from the digital memory means is identical to the modulation which was on the local oscillator signal applied to said first mixer when said specific digital values were derived and stored in the digital memory means.

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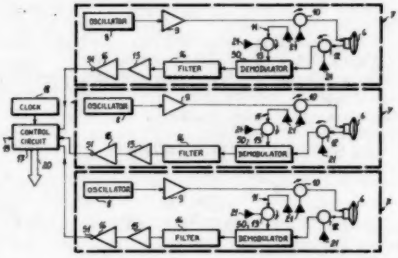
**4,713,663**

## GUIDED VEHICLE CONTROL PROCESS AND APPARATUS

**Serge Drabowitch, Chatenay Malabray; Michel Baril, Lesigny, and Guy Le Parquier, Paris, all of France, assignors to Thomson-CSF, Paris, France**

**Filed Nov. 27, 1985, Ser. No. 802,352**
**Claims priority, application France, Nov. 30, 1984, 84 18328**
**Int. Cl.[4] G01S *13/88*; B61L *3/12***
**U.S. Cl. 342—70** **13 Claims**




1. An apparatus for the control of guided vehicles, comprising:

a plurality of electromagnetic wave reflecting beacons fixed to a track on which said guided vehicles travel wherein said beacons are arranged on said track in such a manner as to provide an indication of speed control of said guided vehicles; and

means for detecting said beacons, said means being fixed to the vehicle wherein said means for detecting includes a transmitting antenna, whose radiation axis has a non-zero angle $\theta$ with the plane perpendicular to the speed vector of the vehicle;

control circuit means connected to said means for detecting said beacons in order to control said guided vehicle.

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**4,713,664**

## POINT CLUTTER THRESHOLD DETERMINATION FOR RADAR SYSTEMS

**John W. Taylor, Jr., Baltimore, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

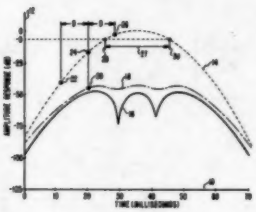
**Filed May 24, 1985, Ser. No. 738,126**
**Int. Cl.[4] G01S *13/52***
**U.S. Cl. 342—91** **24 Claims**

1. An adaptive detection threshold system for a radar having a scanning antenna system, said threshold system comprising:

means for obtaining data corresponding to the amplitude of clutter signals received by the radar for different azimuths of the radar antenna;

means for selecting at least first, second and third values of

said data, with said first value being representative of the clutter amplitude received by the radar when its antenna is positioned in a first direction, said second value being representative of the clutter amplitude received by the radar when its antenna is positioned in a second direction, and said third value being representative of the clutter amplitude received by the radar when its antenna is positioned in a third direction, said second direction being located angularly between said first and third directions;



means for combining said first, second and third values;

means for controlling the detection threshold level for signals received when the radar antenna is in said second direction, with the controlling means being dependent upon a combined value derived from combining said first, second and third values; and

means for inhibiting detection when more than one of said first, second and third values exceeds a predetermined saturation limit.

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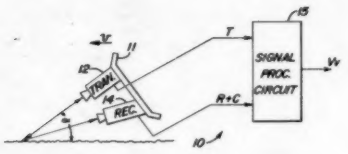
## 4,713,665

## GROUND SPEED SENSOR

James J. Phelan, Bettendorf, Iowa, assignor to Deere & Company, Moline, Ill.

Continuation of Ser. No. 609,626, May 14, 1984, abandoned.
This application Feb. 2, 1987, Ser. No. 6,331
Int. Cl.[4] G01J 9/44
U.S. Cl. 342—104 7 Claims




1. A velocity sensor for sensing the velocity of a vehicle moving over a terrain, the velocity sensor comprising:

a transmitter for transmitting a signal with a certain constant transmit frequency toward the terrain;

a receiver for receiving a signal reflected from the transmitter to the receiver by the terrain, the reflected signal having a variable reflected frequency dependent upon the speed and direction of the motion of the vehicle with respect to the terrain, the receiver also receiving a cross talk component signal having the same frequency as the transmit frequency, the receiver generating a combined signal having variable reflected frequency and constant transmit frequency components;

means for converting the transmit signal to an attenuated, phase-shifted signal;

a summing circuit having a first input receiving the combined signal, a second input receiving the attenuated, phase-shifted signal, the summing circuit operating to cancel the transmit frequency component of the combined signal, the summing circuit thereby providing at an output thereof a modified signal with a substantially pure reflected frequency;

a first circuit for converting the modified signal to a first voltage having a magnitude proportional to the frequency of the modified signal;

a second circuit for converting the transmit signal to a second voltage having a magnitude proportional to the transmit frequency; and

a difference circuit receiving the first and second voltages and generating a third voltage representing a difference between the first and second voltages, the first and second circuits having similar components so that the third voltage is substantially uneffected by component drift.

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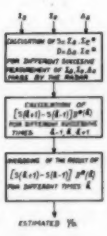
## 4,713,666

## METHOD OF PROCESSING THE SUM AND DIFFERENCE SIGNALS OF A RADAR OF THE MONOPULSE TYPE FOR ESTIMATING THE PARASITE PHASE INTRODUCED BETWEEN THESE SIGNALS BY THE ULTRAHIGH FREQUENCY FORMATION CIRCUITS OF THE SUM AND DIFFERENCE CHANNELS

Jean P. Poux, Orlando, Fla., assignor to Thomson-CSF, Paris, France

Filed Feb. 24, 1987, Ser. No. 17,627
Claims priority, application France, Feb. 28, 1986, 86 02877
Int. Cl.[4] G01S 13/44
U.S. Cl. 342—152 4 Claims



1. A method of processing the sum Σ and difference Δ signals, in azimuth: $\Sigma_a$, $\Delta_a$ and in elevation: $\Sigma_e$, $\Delta_e$, of a radar of the monopulse type, for estimating the parasite phase Ψ introduced between these signals by the ultrahigh frequency formation circuits of the sum and difference channels, comprising:

in calculating for each measurement made by the radar at least one case for the expressions S and D:

first case:

$$\begin{cases} S = \Sigma_a \cdot \Sigma_e \\ D = \Delta_e \cdot \Sigma_a \end{cases}$$

for estimating the azimuth parasite phase $\Psi_a$;

second case:

$$\begin{cases} S = \Sigma_e \cdot \Sigma_a \\ D = \Delta_e \cdot \Sigma_a \end{cases}$$

for estimating the elevational parasite phase $\Psi_e$;

third case:

$$\begin{cases} S = \Sigma_a \cdot \Sigma_e \\ D = \Delta_a \cdot \Sigma_e \end{cases}$$

for estimating the differential parasite phase $\delta\Psi = \Psi_a - \Psi_e$, respectively,

(where the symbol * designates the complex conjugate quan-

tity), it being understood that the radar wave emitted is polarized circularly and that the azimuth

and elevation monopulse receivers receive respectively only one of the circular polarization types: right hand or left hand;

in calculating the expression

$$[S(k+1)-S(k-1)]D^{*}(k)$$

it being understood that the radar antenna sweeps during time in azimuth in the first case and in the second case, in elevation in the second case and that $k-1$, $k$, $k+1$ designate three successive times such that the difference $S(k+1)\,(\theta)-s_{(k-1)}\,(\theta)$ is of the same sign as $d_{(k)}\,(\theta)$, where $S_{(k+1)}\,(\theta)$ and $s_{(k-1)}\,(\theta)$ respectively designate the gain of the sum channel at angle $\theta$, in azimuth in the first case and in the third case, in elevation in the second case, respectively at times $k+1$ and $k-1$, and where $d_{(k)}\,(\theta)$ designates the gain of the difference channel at angle $\theta$ and at time k, in the azimuth in the first and third cases, in elevation in the second case;

in calculating the mean value of the result of the preceding expression for several successive times corresponding to several measurements successively made by the radar, which allows an expression of the form $e^{a\Psi}$. a where $\Psi$ is the parasite phase sought and "a" a real number of given absolute value and sign.

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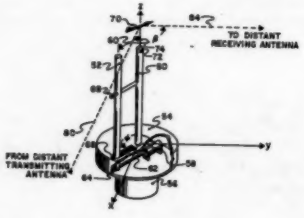
**4,713,667**

## TARGET SUPPORT APPARATUS

**J. Leon Poirier, and Robert V. McGahan, both of Chelmsford, Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Mar. 26, 1987, Ser. No. 30,401**
**Int. Cl.[4] G01S *13/88***
**U.S. Cl. 342—192** **8 Claims**




1. Apparatus for supporting a target undergoing radar measurements comprising:

a base assembly;

azimuthal positioner means coupled to said base assembly for rotating said base assembly in an azimuthal plane;

a first and a second column being parallel and attached perpendicular to said base assembly;

column separation adjusting means for adjusting the spacing between said first column and said second column;

target attitude positioning means affixed to the distal end of said first column; and

means for affixing a target to said target attitude positioning means.

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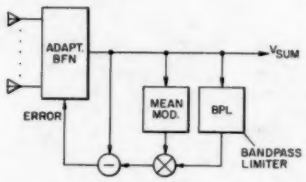
**4,713,668**

## ADAPTIVE ANTENNA

**Francis G. Overbury, Great Dunmow; Christopher R. Ward, Bishop's Stortford, and Jeffrey G. Searle, Stansted Mountfitchet, all of Great Britain, assignors to STC plc, London, England**

**Filed Sep. 18, 1986, Ser. No. 908,563**
**Int. Cl.[4] G01S *3/16, 3/28***
**U.S. Cl. 342—384** **2 Claims**




1. A steered adaptive antenna arrangement including an adaptive beamforming network to which the output signals of an array of antenna elements are applied, the network having a feedback wherein the summed output of the network is correlated with each element signal, applied to a limiter and added to a steering component whereby a derived value is used to drive an associated weight coefficient, characterised in that the summed output of the beamformer network is further applied to a desired signal estimator the output of which is subtracted from the summed output to provide the feedback input to be correlated with each element signal.

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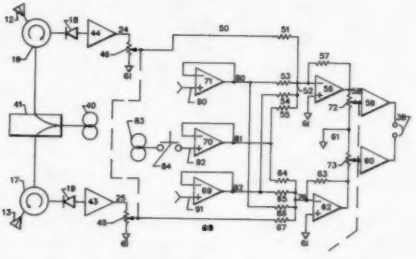
**4,713,669**

## BINAURAL DOPPLER COLLISION ALERT SYSTEM FOR GENERAL AVIATION AIRCRAFT

**Howard P. Shuch, 14908 Sand La., San Jose, Calif. 95124**

**Filed Jul. 23, 1986, Ser. No. 888,759**
**Int. Cl.[4] G01S *3/02***
**U.S. Cl. 342—455** **6 Claims**



1. A system for alerting the pilot of an aircraft, using said system, to the presence and location of another aircraft nearby, which constitutes a potential threat of collision with the user's aircraft, said system consisting of:

a pair of continuous wave microwave doppler reflective radar transceivers disposed in the pilot's aircraft, each of said transceivers, respectively, including at least a horn microwave antenna for generating a directional microwave beam and receiving reflected signals from target objects in said beam, a source of microwave signals connected in common to both of said pair of continuous wave microwave doppler reflective radar transceivers, a duplexer, a mixer and an audio output means;

the respective microwave beams from said continuous wave microwave antennas of said transceivers being directed orthogonally with respect to one another, at an angle of 45

degrees on either side of the longitudinal axis of the user aircraft, the overall beam width of the two beams covering a 180 degree area ahead of said user aircraft;

each of said doppler radar transceivers being adapted to produce an audio signal when a threat object appears in said beams, said audio signals being applied to a binaural audio headset worn by the pilot;

said binaural audio headset being also connected with the communication system of the user aircraft, so that the pilot thereof may be in communication with the ground, or other aircraft as well as hear the binaural signals produced from the collision alert system audio;

the presence of said binaural audio signals being an indication of the presence of a target object, such as another aircraft, in the directional beams of said antennas, and the frequency of said binaural audio signals being an indication of the closing or separation rate between said target object and said user aircraft, the amplitude of said binaural signals being an indication of the range to the target object, and the phase difference between the respective audio signals heard in said binaural headset from each of said pair of doppler radar transceivers being indicative of the direction and location of said target object;

whereby the pilot of the user aircraft is alerted by the binaural audio signals heard in his headset and is able, aurally to locate the target aircraft with respect to the user aircraft, its rate of motion towards the user aircraft and the direction of motion, so as to take appropriate evasive action to avoid a collision.

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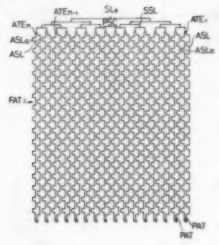
## 4,713,670
## PLANAR MICROWAVE ANTENNA HAVING HIGH ANTENNA GAIN

**Toshio Makimoto, 15-3, Shinsenri Nishi-machi 2-chome, Toyonaka-shi, Osaka 565; Sadahiko Nishimura, 3-25, Tamatsukuri Motomachi, Tennoji-ku, Osaka 543; Masayuki Matsuo, Kobe; Toshio Abiko, Ibaraki; Hirohumi Ishizaki, Osaka; Minoru Kanda, Shijonawate; Hidetsugu Nunoya, and Mikio Komatsu, both of Kadoma, all of Japan, assignors to Toshio Makimoto; Sadahiko Nishimura and Matsushita Electric Works, Ltd., all of Osaka, Japan**

**Filed Jan. 17, 1986, Ser. No. 819,610**
**Claims priority, application Japan, Jan. 21, 1985, 60-8771**
**Int. Cl.[4] H01Q *1/38***
**U.S. Cl. 343—700 MS** **6 Claims**



1. A microwave planar antenna, comprising:

a plurality of antenna elements, wherein each antenna element comprises two microstrip conductors, each conductor having first and second ends and being bent into a plurality of successively connected U-shaped sections, the two conductors being disposed in parallel with mutually staggered U-shaped sections, whereby the two microstrip conductors alternately approach and separate from each other;

means for supplying power to the plurality of antenna elements, wherein the power supply means is a corporate-feed network coupled to the first ends of the microstrip conductors in the plurality of antenna elements; and

a plurality of patch antenna means for radiating power reaching the second ends of the microstrip conductors, wherein each patch antenna means couples the second ends of two microstrip conductors which comprise each antenna element, each patch antenna means is impedance-matched to the antenna element in which it couples the second ends of the two conductors, and each patch antenna means radiates as an antenna which is phase-matched to that antenna element.

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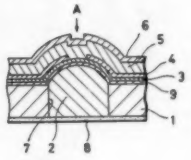
## 4,713,671
## THERMAL HEAD

**Takehiro Takoshima, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Japan**

**Filed Oct. 31, 1986, Ser. No. 926,370**
**Claims priority, application Japan, Nov. 1, 1985, 60-245426**
**Int. Cl.[4] G01D *15/10*; H05B *3/00***
**U.S. Cl. 346—76 PH** **4 Claims**




1. A thermal head having a glass glaze layer, a heat generating resistance layer, an electric power supplying conductor layer and a protecting layer formed on an insulating substrate, wherein said glass glaze layer is so formed that the lower portion thereof is embedded in said insulating substrate and the upper portion thereof is protruded from the surface of said insulating substrate, and a metal layer is disposed in contact with the lower surface of said glass glaze layer.

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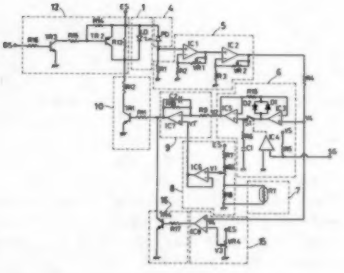
## 4,713,672
## LASER BEAM PRINTER

**Katsushi Horihata, Osaka, and Yoshizo Kawamori, Fujiidera, both of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan**

**Filed Jul. 17, 1986, Ser. No. 887,175**
**Claims priority, application Japan, Jul. 24, 1985, 60-163571**
**Int. Cl.[4] G01D *9/42*; G11B *7/00*; H01S *3/00***
**U.S. Cl. 346—108** **6 Claims**



1. A laser beam printer comprising:

a. a beam source comprising a diode laser,

b. a rotary polygonal mirror rotatable at a constant speed for reflecting a beam from the beam source,

c. a photosensitive member to be scanned by the beam reflected from the rotary polygonal mirror,

d. means for detecting the quantity of light of the beam from the beam source,

e. means for amplifying the output of the light quantity detecting means,
f. means for sampling the output of the amplifying means,
g. temperature sensor means for detecting the temperature of the photosensitive member,
h. means for producing a reference signal as adjusted by the output of the temperature sensor means,
i. means for calculating the difference between the reference signal and the sampled signal,
j. means for adjusting the current to be passed through the diode laser in accordance with the calculated difference,
k. beam sensor means for detecting the beam from the rotary polygonal mirror to produce a horizontal synchronizing signal,
l. means for switching the current through the diode laser, and
m. control means for receiving image data and the horizontal synchronizing signal to drive the switching means.

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**4,713,673**

## IMAGE FORMING APPARATUS IN WHICH MULTIPLE DEVELOPING UNITS ARE SUPPORTED AND MOVED RELATIVE TO AN IMAGE CARRIER

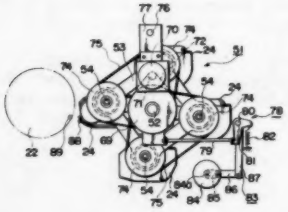
**Hirobumi Kessoku, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Apr. 3, 1986, Ser. No. 847,457**

**Claims priority, application Japan, Apr. 8, 1985, 60-73848; Apr. 10, 1985, 60-75541**

**Int. Cl.[4] G03G *15/01***

**U.S. Cl. 355—4** **7 Claims**



1. An image forming apparatus comprising:
(a) an image carrier adapted to carry a latent image thereon;
(b) a plurality of developing units for developing a latent image on the image carrier, said developing units adapted to contain developing agents of different colors;
(c) revolving means for revolving the developing units in parallel relation and selecting one of the developing units for use by stopping the revolving of the developing units at a predetermined position;
(d) support means, having a center of rocking, for supporting the revolving means at a distance from the center;
(e) shifting means for moving the revolving means supported by the support means toward or away from the image carrier; and
(f) locating means for determining the relative positions of the image carrier and the developing unit selected by the revolving means when the revolving means approaches the image carrier.

**4,713,674**

## EXPOSURE DEVICE FOR SHEETS

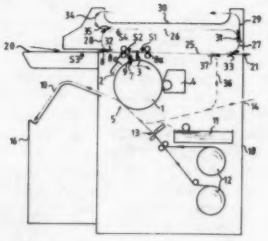
**Paulus G. Giezeman, Belfeld, and Gerhardus E. Romualdus Ter Horst, Al Grubbenvorst, both of Netherlands, assignors to OCE-Nederland B.V., Venlo, Netherlands**

**Filed Apr. 3, 1986, Ser. No. 847,633**

**Claims priority, application Netherlands, Apr. 4, 1985, 8500995**

**Int. Cl.[4] G03G *15/00***

**U.S. Cl. 355—14 SH** **10 Claims**



1. An exposure device for originals, comprising an exposure station, a first endless conveyor path for repeatedly passing an original through said exposure station with the aid of a conveyor; reversible drive means for driving said conveyor, selectively switchable discharge means for discharging originals from said first endless conveyor path, first original measuring means for determining whether the length of said original on said conveyor is larger or smaller than a predetermined value and providing an output control signal when said length is smaller than said value; and control means connected to said measuring means for controlling said drive means such that in response to said control signal the control means controls at the time when said original has passed through said exposure station the reversal of said drive means and the time required to return the entire original back through said exposure station.

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**4,713,675**

## EXPOSURE APPARATUS

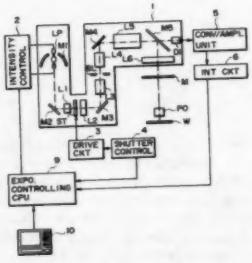
**Yoshikiyo Yui, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 29, 1986, Ser. No. 924,435**

**Claims priority, application Japan, Oct. 31, 1985, 60-242943; Nov. 27, 1985, 60-265110**

**Int. Cl.[4] G03B *27/72***

**U.S. Cl. 355—69** **9 Claims**



1. An exposure apparatus for exposing an object with light, said apparatus comprising:
a light source for emitting light of an intensity;
intensity controlling means operative on said light source to change the intensity of light to be emitted from said light source;

shutter means operable to selectively pass/block the light from said light source;

shutter controlling means operative on said shutter means to control the passage/blockage of the light by said shutter means;

integrating means for converting a quantity of light passed through said shutter means into an electric value and for integrating the electric value;

exposure setting means for setting an amount of exposure to be achieved on the object; and

exposure controlling means for controlling said intensity controlling means and said shutter controlling means on the basis of the amount of exposure set by said setting means, said exposure controlling means being operable to define a delay time before initiation of the exposure of the object and after initiation of the operation of said intensity controlling means upon said light source.

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**4,713,676**

## LOGIC CIRCUIT ARRANGEMENT WITH FIELD EFFECT TRANSISTORS MATCHED THERETO

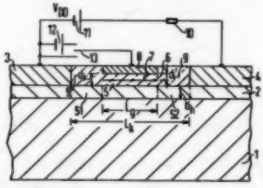
**Hartwig W. Thim, Wolfauerstrasse 10, A4040 Linz, Austria**

**Filed Apr. 10, 1985, Ser. No. 721,797**

**Claims priority, application Austria, Apr. 10, 1984, 1194/84**

**Int. Cl.⁴ H01L** *29/78*

**U.S. Cl. 357—23.5** **8 Claims**



**1**. A logic circuit arrangement suitable for short switching times, for large-scale integration with high component density, and for operation with a power supply with only one polarity of a supply voltage, comprising:

a stage having a field effect transistor whose drain is direct coupled to a gate of a field effect transistor of a following stage;

the field effect transistors each having an active semiconductor zone, source region, drain region, channel region, gate electrode, and gate insulation;

at least one of the transistors having a source, drain, and channel region all of the same conductivity type and which would result in a normally on depletion type transistor but for a buried and charged electrode layer positioned within the gate insulation and buried under the gate electrode;

a first insulating layer portion of the gate insulation separating said gate electrode and said electrode layer from one another, and a second insulating layer portion of the gate insulation separating the active semiconductor zone and said electrode layer from one another, the first and second layers having respective thicknesses $d_i'$ and $d_i - d_i'$ such that they cannot be tunnelled through by charge carriers during normal operation of the circuit arrangement;

a respective insulsting protective lateral spacing between the source and the buried electrode layer, and between the drain and the buried electrode layer, being substantially greater than the thicknesses $d_i'$ and $d_i - d_i'$ and chosen so that non-aligned portions in the active semiconductor zone laterally of a vertically aligned portion of the active semiconductor zone beneath the gate electrode are substantially undepleted by the buried electrode layer so as to remain normally on; and

the buried elecrode layer having an area-specific electrical charge $Q_{HSS}$ of $Q_{HSS}$ which is from 1 to 1.2 times

$$\frac{\epsilon_i \varepsilon N_D}{2\epsilon_h d_i'}\left(d_h^2 + 2d_h d_i \frac{\epsilon_h}{\epsilon_i} - \frac{2\psi_{mh}\epsilon_h}{e^2 N_D}\right) \quad (Cb/cm^2)$$

where $\epsilon_h$ is a dielectric constant of the semiconductor material of the active zone, $\epsilon_i$ is a dielectric constant of the gate insulation, $d_h$ is a thickness of the active semiconductor zone, $N_D$ is a doping of the active semiconductor zone with donors for n-conductive transistors, and $\Psi_{mh}$ is a work function difference of electrons (in volts) between a metal of the gate electrode and a material of the active semiconductor zone, said electrical charge having a magnitude which defines a transition from inhibiting and normally off with no voltage applied to the gate electrode to conductive operation of the transistor with voltage applied to the gate electrode which undepletes the vertically aligned portion.

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**4,713,677**

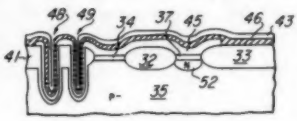
## ELECTRICALLY ERASABLE PROGRAMMABLE READ ONLY MEMORY CELL INCLUDING TRENCH CAPACITOR

**Howard L. Tigelaar, Allen; Bert R. Riemenschnschneider, Murphy, and James L. Paterson, Richardson, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 707,008, Feb. 28, 1985, abandoned. This application Oct. 2, 1986, Ser. No. 914,517**

**Int. Cl.⁴ H01L** *29/78, 27/02, 29/34*

**U.S. Cl. 357—23.5** **6 Claims**



**1**. An electrically erasable programmable read only memory cell which may be programmed using a reduced voltage level comprising:

(a) a substrate having moat regions formed therein, said moat regions having a gate oxide layer formed on the surface of said moat regions;

(b) field oxide regions disposed between said moat regions formed in said substrate, one of said field oxide regions containing at least one trench, each trench having a bottom and side walls formed of a first oxide layer;

(c) a floating gate disposed on the surface of said gate oxide layer, one of said field oxide regions and said first oxide layer;

(d) an insulating layer disposed over said floating gate; and

(e) an electrically conductive line disposed above and insulated from said floating gate by said insulating layer and serving as a word line for said memory, said conductive line having a substantially planar upper exposed surface over said trench.

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**4,713,678**

## DRAM CELL AND METHOD

**Richard H. Womack, Dallas; Sanjay K. Banerjee, Richardson; Hisashi Shichijo, and Satwinder Malhi, both of Garland, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 679,162, Dec. 7, 1984, abandoned. This application Nov. 13, 1986, Ser. No. 928,717**

**Int. Cl.⁴ H01L** *29/78, 27/02, 29/06, 29/04*

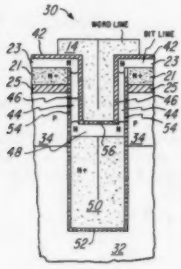
**U.S. Cl. 357—23.6** **10 Claims**

**6**. A memory cell in a substrate comprising:

a conductive region formed in a trench formed in said sub-

strate, said conductive region being insulated from said substrate;

an epitaxial layer formed in the portion of said trench not occupied by said conductive region, said epitaxial layer




including a source region in contact with said conductive region, a drain region, and a channel region between said source and drain regions in contact with said substrate;

a gate formed adjacent to said channel region but insulated from said channel region.

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**4,713,679**

## REVERSE BLOCKING TYPE SEMICONDUCTOR DEVICE

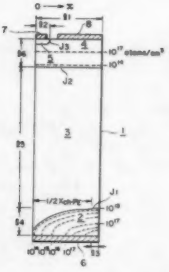
**Yoshio Terasawa, Katsuta, and Saburo Oikawa, Hitachi, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Oct. 15, 1985, Ser. No. 787,116**

**Claims priority, application Japan, Oct. 15, 1984, 59-215689; Mar. 23, 1985, 60-58950**

**Int. Cl.⁴ H01L** *29/74, 29/80*

**U.S. Cl. 357—38** **10 Claims**



**1.** A reverse blocking type semiconductor device comprising:

a semiconductor substrate having a pair of principal surfaces and including four semiconductor layers in a region sandwiched between the principal surfaces, adjacent ones of said semiconductor layers being different in conductivity type from each other, one of the outermost semiconductor layers being surrounded by a semiconductor layer adjacent thereto, said one outermost semiconductor layer and said semiconductor layer adjacent thereto being exposed to one of said principal surfaces, wherein the other outermost semiconductor layer includes a first portion which has an impurity concentration gradient in a direction parallel to the other principal surface, and a second portion which is devoid of an impurity concentration gradient in a direction parallel to said other principal surface, wherein the second portion is narrower than the first portion along said direction parallel to said other principal surface;

a cathode electrode kept in low-resistance contact with said one outermost semiconductor layer;

a gate electrode lying in close proximity to said one outermost semiconductor layer; and

an anode electrode kept in low-resistance contact with said first and second portions of said other outermost semiconductor layer.

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**4,713,680**

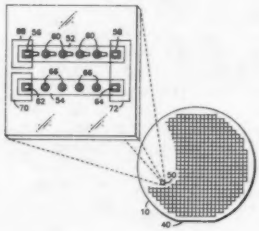
## SERIES RESISTIVE NETWORK

**William F. Davis, and Robert L. Vyne, both of Tempe, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Jun. 30, 1986, Ser. No. 880,538**

**Int. Cl.⁴ H01L** *29/06, 23/48, 29/44, 21/479*

**U.S. Cl. 357—51** **11 Claims**




**1.** A resistive circuit formed in a semiconductor substrate, comprising:

a first resistive region in said substrate having first and second ends;

a second resistive region in said substrate having first and second ends, the second end of said first region electrically coupled to the first end of said second region;

a first metallic contact for contacting said first region proximate its first end; and

a second metallic contact for contacting said second region proximate its second end, said first and second regions being directionally oriented on said substrate such that current flowing from said first contact toward said second contact will cause metal of said first metallic contact to migrate in a direction from said first contact toward the second end of said first region, and current flowing from said second contact toward said first contact will cause metal to migrate in a direction from said second contact toward the first end of said second region.

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**4,713,681**

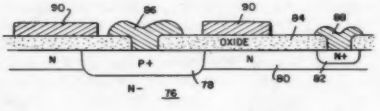
## STRUCTURE FOR HIGH BREAKDOWN PN DIODE WITH RELATIVELY HIGH SURFACE DOPING

**James D. Beasom, Melbourne Village, Fla., assignor to Harris Corporation, Melbourne, Fla.**

**Continuation of Ser. No. 739,844, May 31, 1985, abandoned. This application May 5, 1987, Ser. No. 48,482**

**Int. Cl.⁴ H01L** *29/34*

**U.S. Cl. 357—52** **37 Claims**




**1.** A high voltage PN junction comprising:

a first semiconductor region of a first conductivity type having a surface;

a second semiconductor region of a second conductivity type in said surface;

a field plate separated from said surface by a layer of insulation and extending laterally across said surface from the surface junction of said first and second regions over said first region;

the impurity concentration of said first region decreasing from said surface having a high impurity concentration region at said surface and extending down along a substantial portion of the depth of said second region greater than the depth of and having a higher charge density than a surface accumulation region and a low impurity region adjacent the bottom of said second region so that said high impurity concentration region under said field plate is depleted by biasing said field plate before a critical field is reached in the portion of said high impurity concentration region under said field plate.

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4,713,682

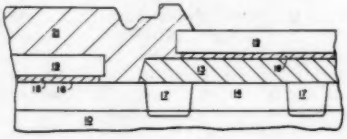
## DIELECTRIC BARRIER MATERIAL

David G. Erie, Cottage Grove; Jon A. Roberts, Minnetonka, and Eddie C. Lee, Bloomington, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Division of Ser. No. 603,861, Apr. 25, 1984, abandoned. This application Dec. 31, 1985, Ser. No. 815,426

Int. Cl.[4] H01L *29/34*

U.S. Cl. 357—54 16 Claims



1. An integrated circuit, comprising:

a substrate comprising a semiconductor material and having a first surface;

a layer of metalization interconnects over the first surface, each interconnect having a width;

a first thin film layer comprising a dielectric barrier material deposited directly onto the layer of metalization interconnects;

a second thin film layer comprising a dielectric passivating material deposited directly onto the first thin film layer of dielectric barrier material;

a first via formed in the two thin film layers over a first of the metalization interconnects; a second via formed in the first of the metalization interconnects, the second via lying at least in part, beneath the first via and having a length which is less than the length of the first via, so that the first of the metalization interconnects is exposed by the first via and a portion of the first surface is exposed by the second via, the unexposed portion of the first of the metalization interconnects remaining covered by the two thin film layers and the first of the metalization interconnects having a width less than the width of the first via; and

a second layer of metalization interconnects, one of the second layer of metalization interconnects being connected to the first of the metalization interconnects in the vias.

4,713,683

## ILLUMINATING AND SYNCHRONIZING DEVICE FOR COLOR IMAGING EQUIPMENT

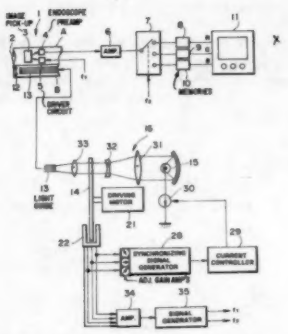
Hiroyoshi Fujimori, Hachioji, and Tatsuo Nagasaki, Musashino, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Aug. 26, 1985, Ser. No. 768,998

Claims priority, application Japan, Aug. 31, 1984, 59-183085

Int. Cl.[4] H04N *9/04, 7/18;* A61B *1/06*

U.S. Cl. 358—42 5 Claims



1. An illuminating and synchronizing system for lighting a subject of an electronic color imaging device which includes a solid state iamge pick-up device, comprising:

an illuminating light source;

color filter means for decomposing light from said light source into different colors comprising a rotating disc having a plurality of color filter areas of different colors separated from one another by light shielding regions and disposed to pass in the light path of said light source between said light source and said subject;

first timing means for producing a color frame detecting signal for each said color filter area to denote the times of passage of said color filter areas in the light path of said light source;

synchronizing signal generating means, responsive to said color frame detecting signals, including three adjustable gain amplifiers and being synchronized by said first timing means to generate a synchronizing signal having a different amplitude corresponding to each of said color filter areas, respectively, and current controlling means connected to said synchronizing signal generating means and to said light source to control the amount of current to said light source, sequentially, in response to said synchronizing signal of different ampitudes and in proportion to amplitudes of the synchronizing signal for sequentially controlling the amount of light passing through said color filter areas in synchronism with the time of passage of respective color filter areas in the light path of said light source;

second timing means for producing a start signal to indicate the beginning of each rotation of said rotating disc;

said first and second timing means comprising openings formed in peripheral areas of said disc light shielding regions, and photo-interrupter means including a plurality of photo-couplers for producing output signals which indicate passage of said openings through said photo-interrupter means; and

signal generator means arranged to receive the output signals of said first and second timing means, and connected to said electronic color imaging device, for generating first reading clock signals to synchronize a driver circuit of said color imaging device to read a signal form said solid state image pick-up device during passage of light shielding regions of said disc between said light source and said subject, and for generating second timing signals

to serve as color frame switching signals of said color imaging device.

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**4,713,684**

## IMAGE PROCESSING APPARATUS FOR DISCRIMINATING AND PROCESSING DIFFERENT FORMATS OF COLOR IMAGE SIGNALS

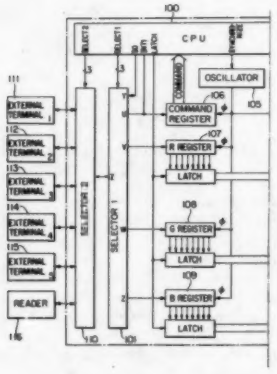
**Naoto Kawamura, Yokohama, and Shunichi Abe, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

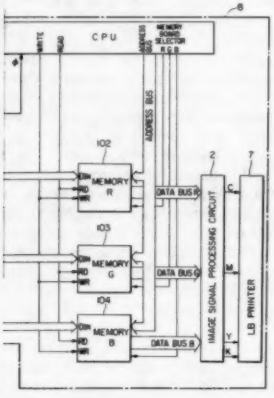
**Continuation of Ser. No. 586,070, Mar. 5, 1984, abandoned. This application Apr. 17, 1987, Ser. No. 39,762**

**Claims priority, application Japan, Mar. 8, 1983, 58-37707**

**Int. Cl.[4] H04N** *1/46, 1/32, 1/40*

**U.S. Cl. 358—78** **19 Claims**




**1.** Color image data processing apparatus comprising:

input means including a common transmission channel and means for inputting to said common transmission channel a plurality of data signals, each data signal having a different one of a plurality of data formats in each of which a plurality of color component data are arranged during respective different periods of the data signal;

separation means for separating the plurality of color component data from each said data signal in accordance with the format of that data signal; and

memory means for storing the plurality of color component data separated by said separation means.

**4,713,685**

## VIDEO MONITORING APPARATUS

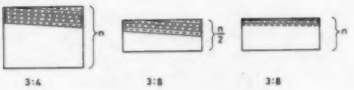
**Shigeru Nishimura, Machida, and Toshihisa Kuroda, Sagamihara, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Oct. 4, 1985, Ser. No. 784,021**

**Claims priority, application Japan, Oct. 5, 1984, 59-209104; Nov. 9, 1984, 59-236135; Dec. 14, 1984, 59-263861; Apr. 18, 1985, 60-82827; Jun. 19, 1985, 60-133231**

**Int. Cl.[4] H04N** *7/00, 7/01*

**U.S. Cl. 358—103** **7 Claims**




**1.** A video monitoring apparatus comprising:

a video camera for observing a scene and providing an analog signal thereof;

an analog-digital convertor for converting an analog signal from said camera consisting of n scanning lines to a digital signal,

abridge and memory means for memorizing an abridged part of said digital signal abridged from said digital signal corresponding to said n scanning lines,

picture range conversion means for converting a picture range by reading out memorized data from said memory means, to reconstitute a picture signal consisting of n scanning lines, and

display means for displaying video pictures produced by said picture range conversion means.

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**4,713,686**

## HIGH SPEED INSTANTANEOUS MULTI-IMAGE RECORDER

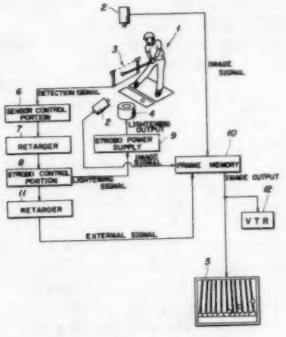
**Haruhiko Ozaki; Tadatoshi Yamada; Kunio Machida; Kiyoshi Ohno; Hirato Shimazaki, all of Tokyo; Hidekimi Inoue, Saitama, and Ryohei Uji, Tokyo, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan**

**Filed Jun. 30, 1986, Ser. No. 880,269**

**Claims priority, application Japan, Jul. 2, 1985, 61-36762; Dec. 10, 1985, 60-277331**

**Int. Cl.[4] H04N** *7/18*

**U.S. Cl. 358—107** **3 Claims**




**1.** A high speed instantaneous multi-image recorder comprising:

at least one video camera, a sensor and a light emitting portion located so as to be directed towards a moving object;

a frame memory connected to said video camera to receive image signals from said video camera and connected to send images for one frame to a monitor in synchronism with an external signal;

a strobo arrangement connected to said light emitting portion and actuating it to produce a plurality of flashes for one frame of the video camera;

a first retarder connected to said sensor to receive detection signals coming from the sensor, the strobo arrangement being connected to receive signals from the first retarder; and

a second retarder connected to said strobo system for producing said external signal;

said frame memory being connected to receive said external signal from a second retarder, whereby said frame memory is synchronized with flashes emitted by said light emitting portion via said second retarder so that a plurality of instantaneous poses illuminated by a plurality of flashes of said light emitting portion within one frame of the video camera are displayed at the same time on said monitor.

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**4,713,687**

## SCAN LINE TYPE DYNAMIC OBSERVATION APPARATUS

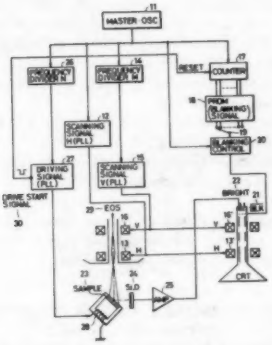
**Ryuichi Shimizu, Minoo, and Takashi Ikuta, Ibaraki, both of Japan, assignors to Research Development Corporation of Japan, Tokyo, Japan**

**Continuation of Ser. No. 580,986, Feb. 16, 1984, abandoned. This application Jan. 13, 1986, Ser. No. 818,391**

**Claims priority, application Japan, Mar. 31, 1983, 58-56695; Mar. 31, 1983, 58-56696**

**Int. Cl.[4] H04N 7/12**

**U.S. Cl. 358—138** **2 Claims**




1. A scan line type dynamic observation apparatus for successively sampling specific phases from image signals of a period of a repeating phenomenon which forms an object of observation which varies periodically and at high speed to obtain an image of a specific phase, the apparatus comprising:

image signal sampling means for sampling image signals from said object of observation in terms of the specific phase at fixed intervals;

synchronous scanning means for synchronously scanning said object of observation and a display during a period of sampling by said image signal sampling means;

fixed area scanning means for surface scanning with said synchronous scanning means in synchronization with said display over a fixed area of said object of observation; and

display means for displaying the image signal subjected to said sampling.

**4,713,688**

## METHOD FOR INCREASING RESOLUTION IN A COMPATIBLE TELEVISION SYSTEM

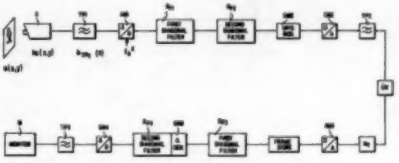
**Eckhard Güttner, Dortmund, Fed. Rep. of Germany, assignor to ANT Nachrichtentechnik GmbH, Backnang, Fed. Rep. of Germany**

**Filed Sep. 24, 1985, Ser. No. 779,599**

**Claims priority, application Fed. Rep. of Germany, Sep. 26, 1984, 3435265**

**Int. Cl.[4] H04N 7/00**

**U.S. Cl. 358—141** **3 Claims**



1. A method for increasing image resolution in a compatible television system, in which system an optical image is scanned along vertically spaced horizontal raster lines by a high line number television camera, the resulting picture signal is subjected to a horizontal frequency band limitation for further digital processing, said method comprising,

at a transmitter:

sampling the resulting picture signal in the direction of horizontal frequencies in the spatial domain with a horizontal sample spacing corresponding to the vertical spacing between adjacent lines of the resulting picture signal;

effecting two-dimensional filtering of the sampled picture signal with respect to two mutually transverse diagonals of the scanned image;

offset modulating the filtered picture signal and band limiting the filtered picture signal to a selected bandwidth to produce a modified picture signal containing components capable of causing interference in a compatible receiver;

imparting to the components capable of causing interference a relatively reduced amplitude;

transmitting the signal which has been offset modulated, band limited and to which has been imparted relatively reduced amplitude components over a transmission channel to a receiver and,

at a receiver:

subjecting the signal arriving from the transmission channel to band limitation in the direction of horizontal spatial frequencies by means of a Nyquist filter;

sampling the signal leaving the Nyquist filter in an orthogonal raster, with a horizontal sample spacing corresponding to the vertical spacing between adjacent lines of the signal received at the receiver;

combining the received signal portions associated with two successive picture fields into a picture frame signal;

effecting a first one-dimensional filtering of the resulting picture frame signal with respect to a first diagonal of the image represented by the picture frame signal;

offset demodulating the signal resulting from the first filtering while effecting relative amplitude increase of those components to which a relative amplitude reduction had been imparted before transmission;

effecting a second one-dimensional filtering of the offset demodulated signal with respect to a second diagonal transverse to the first diagonal; and

band limiting the two-dimensionally filtered signal before delivery to a television monitor.

## 4,713,689
## FREQUENCY DEMODULATOR FOR TELEVISION RECEIVER WITH TIME MULTIPLEXING

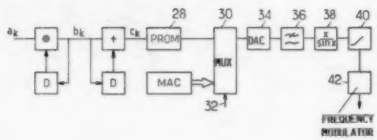
**Jacques Veillard, Saint Gregoire, France, assignor to Centre National d'Etudes des Telecommunications, Issy les Moulineaux and Etablissement Public de Diffusion dit "Telediffusion de France", Montrouge, both of, France**

**Filed May 31, 1985, Ser. No. 739,719**

**Claims priority, application France, Jun. 4, 1984, 84 08727**

**Int. Cl.[4] H04N** *7/04, 7/08*

**U.S. Cl. 358—146** **12 Claims**




**1**. In a receiver for a television system using a RF time division multiplex of analog image signals and digital data and sound signals, said digital signals being coded in a form such that the frequency spectral width required by the analog signals is greater than that required by the digital signals,

a frequency demodulator constructed for delivering demodulated signals on an output comprising: a common input filter connected to receive said multiplex and having a band pass width adjustable between a predetermined higher value close to a value which is optimum for the analog signals when the latter have a high signal-to-noise ratio and a predetermined lower value close to a value which is optimum for the digital signals; and means for automatically adjusting said band pass width responsive to the demodulated signals whereby to optimize reception of the analog image signals without deteriorating the digital data and sound signals.

## 4,713,690
## SAMPLING CLOCK PHASE CORRECTION CIRCUIT OF VIDEO SIGNAL

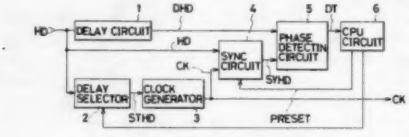
**Shinya Watanabe; Fumihiro Tanaka; Kaneo Yamaguchi; Yoshio Shimada, and Kenichi Matsushima, all of Tokyo, Japan, assignors to Seiko Instruments & Electronics Ltd., Tokyo, Japan**

**Filed Sep. 29, 1986, Ser. No. 912,944**

**Claims priority, application Japan, Oct. 1, 1985, 60-218230**

**Int. Cl.[4] H04N** *5/04*

**U.S. Cl. 358—148** **2 Claims**




**1**. In an output device such as a hard copy device in a video signal generation apparatus such as a graphic display, a sampling clock pulse signal phase correction circuit for video signals comprising:

(a) a video signal sampling clock generation circuit for producing a video signal sampling clock signal having a constant phase relation with respect to a reference input signal;

(b) a phase detection circuit for comparatively detecting the phase of the video signal sampling clock signal from said sampling clock generation circuit and the phase of a video sync signal and producing an output detection signal; and

(c) a CPU circuit for receiving the output detection signal and discriminating the advance and delay of the phase of the video signal sampling clock signal with respect to the phase of the video sync signal so that the phase of said reference input signal of said video signal sampling clock generation circuit is controlled in accordance with the result of detection of said CPU circuit so that the phase of said video signal sampling clock signal is changed and corrected relative to the phase of the video sync signal.

## 4,713,691
## INTERFACE CIRCUIT OF VIDEO SIGNAL HARD COPY APPARATUS

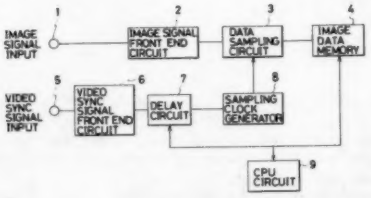
**Fumihiro Tanaka; Yoshio Shimada; Kaneo Yamaguchi; Kenichi Matsushima, and Shinya Watanabe, all of Tokyo, Japan, assignors to Seiko Instruments & Electronics Ltd., Tokyo, Japan**

**Filed Sep. 29, 1986, Ser. No. 912,946**

**Claims priority, application Japan, Oct. 1, 1985, 60-150232[U]**

**Int. Cl.[4] H04N** *5/04, 1/36*

**U.S. Cl. 358—148** **1 Claim**




**1**. In a recording apparatus **(60)** for receiving a video signal **(51)** for displaying image data on a display device **(50)** and printing and recording said image data, an interface circuit of a video signal hard copy apparatus comprising:

(a) a delay circuit **(7)** which sets arbitrarily a delay quantity of a sync signal;

(b) a sampling clock generation circuit **(8)** which has a predetermined phase relation with a video sync signal through said delay circuit **(7)**;

(c) a data sampling circuit **(3)** which samples an image signal by said sampling clock;

(d) an image data memory circuit **(4)** which stores the output of said sampling circuit; and

(e) a control circuit **(9)** which receives the data of said memory circuit **(4)** and sets the delay quantity of said delay circuit **(7)**;

whereby a plurality of data samples for said delay quantity are compared in order to set the delay quantity.

## 4,713,692
## METHOD AND APPARATUS FOR DERIVING FRAME INTERVAL SIGNALS

**Robert N. Kirkland, Mitcham, England, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Apr. 11, 1986, Ser. No. 850,634**

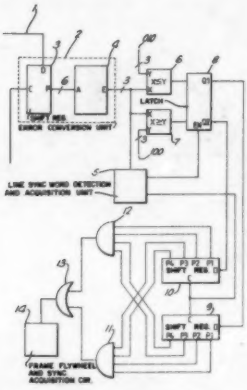
**Claims priority, application United Kingdom, Apr. 29, 1985, 8510862**

**Int. Cl.[4] H04N** *5/06*

**U.S. Cl. 358—150** **11 Claims**

**1**. A method of deriving signals at frame intervals from a received television signal which has two predetermined digital words which alternate line-by-line for a substantial part of a frame period of the television signal but which are each repeated in a respective pair of adjacent lines in the remaining part of the frame period, said method comprising the steps of comparing portions of each line period with one of the digital words and producing therefrom an error signal representing the number of bits in said portions which differ from said one digital word, and using said error signals to produce signals at frame intervals, characterized in that in order to produce said

signals at frame intervals from said error signals the method further comprises comparing said error signals with a maximum number of permitted errors for each digital word and producing therefrom first and second detection signals for said first and second digital words when said errors are equal to or less than that permitted during a specified time in each line




period, recording the resulting first and second detection signals over four line periods and detecting correspondence between a first pair out of said four line periods of said first detection signal with a different pair out of said four line periods of said second detection signal and also between the remaining ones out of the four line periods of said first and second detection signals to produce said signals at frame intervals.

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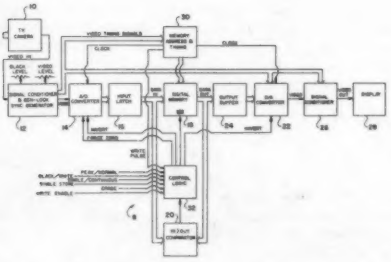
**4,713,693**

## COMPOSITE SINGLE VIDEO IMAGE SYSTEM AND METHOD UTILIZING VIDEO PEAK STORING MEMORY

**Glen R. Southworth, and Robert J. Cornilsen, both of Boulder, Colo., assignors to Colorado Video, Incorporated, Boulder, Colo.**

**Filed Aug. 6, 1984, Ser. No. 638,299**
**Int. Cl.[4] H04N** *5/14*
**U.S. Cl. 358—160** **8 Claims**



**1.** A video image forming system capable of producing an image consisting of information derived from a plurality of frames of video input signals, said video image forming system, comprising:

input means for receiving, by frames, a composite video signal representative of an image and providing output data in analog form indicative of said frames of said composite video signal;

analog-to-digtal converter means for receiving said output data from said input means and providing first output data in digital form indicative of said frames of said composite video signal;

digital memory means having an input connected with said analog-to-digital converter means, said digital memory means selectively storing said first output data from said analog-to-digital converter means and providing said output data stored as second output data in digital form with said second output data not being applied to said input of said digital memory means;

digital-to-analog converter means for receiving said second output data from said digital memory means and providing output data in analog form indicative thereof;

output means connected with said digital-to-analog converter means for providing an output signal suitable for display represented by said second output data from said digital memory means;

comparator means connected with said analog-to-digital converter means and said digital memory means for receiving said first and second output data in digital form from said analog-to-digital converter means and said digital memory means and effecting a comparison of said first and second output data; and

control means connected with said analog-to-digital converter means and said digital-to-analog converter means to control converting of said output data, end connected with said digital memory means and said comparator means for initially enabling said first output data indicative of at least one frame of the composite video signal to be stored in said digital memory means so that said comparator means thereafter receives said first output data from said analog-to-digital converter means and said second output data from said digital memory means, with said first output data and said second output data being representative of a like number of frames and with said comparator means comparing predetermined corresponding parts of said first output data and said second output data, whereby, responsive to comparison of said first output data and said second output data by said comparator means, said control means enables said parts of said first output data representative of a value greater than that of said corresponding parts of said second output data to be stored in said digital memory means to replace corresponding parts of said output data stored in said digital memory means with said replacement being not limited to a single replacement occurrence.

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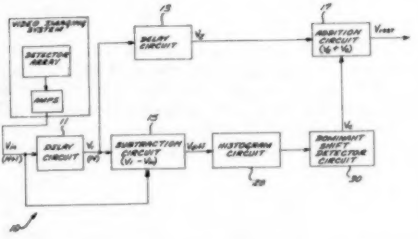
**4,713,694**

## NONINVASIVE DC RESTORATION TO UPGRADE AC COUPLED SYSTEMS

**Robert Zwirn, Los Angeles, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Sep. 9, 1985, Ser. No. 774,105**
**Int. Cl.[4] H04N** *5/16*
**U.S. Cl. 358—171** **13 Claims**




**1.** For an AC coupled video imaging system such as one having a detector array and AC coupled amplifiers for providing a single serial input video signal representing a plurality of video lines, a video correction circuit comprising:

means responsive to the video signal for providing a difference video signal indicative of the running difference video between two versions of the video signal spaced one line apart, for all pairs of lines

histogram means responsive to said difference video signal for generating histogram data indicative of the number of occurences of different values of said difference video signal;

detector means responsive to said histogram data for determining a dominant DC shift between ongoing consecutive video lines of the input video signal, and for providing a video correction signal based on said dominant DC shift; and

correction means responsive to video signal of the second of the consecutive video lines and said video correction signal for providing a corrected video signal.

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**4,713,695**

## SYSTEM FOR SUPERIMPOSING PLURAL TELEVISION PICTURES WITH EXTENT OF SUPERIMPOSITION BASED UPON A LINEAR COMBINATION OF THE PICTURE SIGNALS

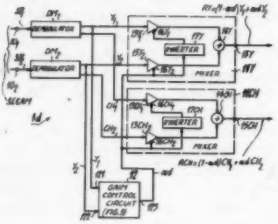
**Guy Macheboeuf, Pullay par Verneuil sur Avre, France, assignor to Etablissment Public Telediffusion de France, Paris, France**

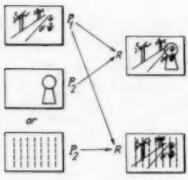
**Filed Jan. 28, 1986, Ser. No. 823,249**

**Claims priority, application France, Jan. 28, 1985, 85 01133**

**Int. Cl.[4] H04N *5/262, 5/272***

**U.S. Cl. 358—183** **22 Claims**





1. A television picture superimposing system comprising

mixing means including first and second variable gain amplifying means for amplifying first and second input picture signals having a predetermined peak-to-peak amplitude into first and second amplified picture signals and adding means for mixing said first and second amplified picture signals into a resulting picture signal, and

means for deriving a single gain control signal based upon a predetermined linear combination of first and second signals derived respectively from said first and second input picture signals so that said resulting picture signal has said predetermined peak-to-peak amplitude, said gain control signal being applied, via analog inverting means and directly, to gain control inputs of said first and second variable gain amplifying means respectively.

**4,713,696**

## PICTURE BLOCK RETRANSMISSION ARRANGEMENT RAPIDLY OPERABLE EVEN WHEN A TRANSMISSION PATH HAS AN INFERIOR QUALITY

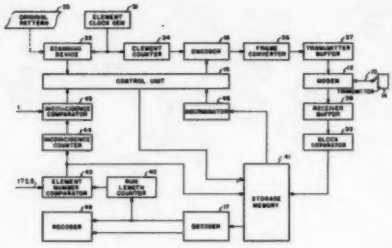
**Takashi Ishikawa; Hiroshi Fukagawa, and Hiroyasu Matsui, all of Tokyo, Japan, assignors to NEC Corporation, Japan**

**Filed Oct. 23, 1986, Ser. No. 922,195**

**Claims priority, application Japan, Oct. 28, 1985, 60-242072**

**Int. Cl.[4] H04N *1/413***

**U.S. Cl. 358—261** **5 Claims**



1. A picture block retransmission arrangement of a receiver for use in combination with a transmitter for transmitting a picture block signal comprising a plurality of band-compression encoded picture line signals which are representative of successive picture lines of an original pattern, respectively, said receiver comprising decoding means for decoding the picture block signal transmitted from said transmitter into a reproduced block signal comprising a plurality of reproduced line signals which are representative of said successive picture lines to correspond to the respective picture lines, wherein the improvement comprises,

checking means for checking whether each of said reproduced line signals is a correct line signal correctly representative of a corresponding one of said successive picture lines or is an incorrect line signal which is not correctly representative of a corresponding one of said successive line signal;

retransmission requesting means for requesting said transmitter to again transmit said picture block signal as a retransmitted block signal when the incorrect line signals are not less in number than a predetermined number and

substituting means for substituting an again reproduced line signal for each said incorrect line signal to produce a substituted block signal when both said again reproduced line signal and said each incorrect line signal correspond to a single one of said successive picture lines, said again reproduced line signal being one of the reproduced line signals of the reproduced block signal into which said retransmitted block signal is decoded by said decoding means.

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**4,713,697**

## CAMERA APPARATUS

**Makoto Gotou, Nishinomiya; Hiroshi Mitani, Daito, and Yoshiaki Igarashi, Ikoma, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Apr. 14, 1986, Ser. No. 851,528**

**Claims priority, application Japan, Apr. 18, 1985, 60-82864; Apr. 18, 1985, 60-82865; May 7, 1985, 60-96924; May 8, 1985, 60-97201; May 20, 1985, 60-10733**

**Int. Cl.[4] H01J *31/50***

**U.S. Cl. 358—222** **22 Claims**

1. A camera apparatus comprising;

a lens barrel unit mounting therein an image-pickup element;

picture-signal processing means for generating a video signal from an electrical signal produced by image-pickup element;

support unit that supports said lens barrel unit rotatably

about a rotation shaft thereof that crosses an axis of incident light entering into said lens barrel unit generally perpendicularly;

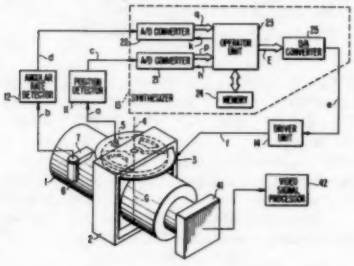
actuator means installed between said lens barrel unit and said support unit for rotating said lens barrel unit;

position-detection means for detecting a relative angle between said lens barrel unit and said support unit;

angular rate detection means for detecting an angular rate of said lens barrel unit about said rotation shaft viewed from an inertia coordinate;

synthesizing means for producing a signal in response to output signals of said position-detection means and said angle-speed detection means;

driver means for supplying power to said actuator means in response to said signal from said synthesizing means;




panning-operation detection means for detecting that panning operation is underway;

synthesizer-operation changing means for varying operations of said synthesizing means in accordance with an operative state of said panning-operation detection mean; and

means for first activating operation of said synthesizer-operation varying means as soon as said panning-operation detection means detects the activated panning operation and then causes specific driving force to be applied to said lens barrel unit corresponding to the actual condition of panning operation after varying operation of said synthesizing means.

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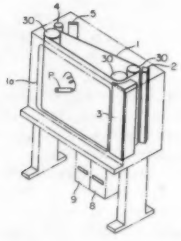
**4,713,698**

## WRITE-IN ELECTRONIC DISPLAY RECORDER

**Teruomi Takahashi, Urayasu, and Tadashi Sato, Kokubunji, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 14, 1986, Ser. No. 896,226**
**Claims priority, application Japan, Aug. 19, 1985, 60-181250**
**Int. Cl.[4] H04N *1/21*; G09G *3/26*; G01D *9/00, 15/06***
**U.S. Cl. 358—296** **11 Claims**



1. An electronic display recorder capable of displaying and recording written image information, comprising:

a sheet-like board member on which image information is to be written;

support means for longitudinally movably supporting said board member;

a drive source for driving said board member;

first read means for reading the image information written on said board member;

second read means for reading image information of a document sheet;

means for writing the image information onto said board member in accordance with the image information read from said document sheet; and

means for recording the image information read by said first read means.

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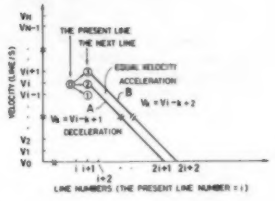
**4,713,699**

## A METHOD OF CONTROLLING THE MOVEMENT OF A MEDIUM TO BE PRINTED

**Kozoo Nakamura, Hitachiohta; Yasuyuki Kozima; Nagaharu Hamada, both of Hitachi, and Kunihiro Sakata, Hayama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Mar. 10, 1986, Ser. No. 837,679**
**Claims priority, application Japan, Mar. 8, 1985, 60-44846**
**Int. Cl.[4] H04N *1/22*; G03G *15/00***
**U.S. Cl. 358—296** **8 Claims**




1. A method of controlling movement of a print medium to be printed, including:

printing means for printing image signals on a print medium as printing units of predetermined length, said printing units being printed at different printing velocities in accordance with the content of said image signals; and

moving means for moving said print medium, based on said printing units at a predetermined decelerating or accelerating rate of a moving velocity;

the method comprising steps of:

assigning an actual moving velocity at an arbitrary i-th (wherein i=1, 2, 3 - - - , and I) printing unit to be used as a first virtual moving velocity at an (i+1)-th printing unit, and

determining an actual moving velocity for said print medium at said (i+1)-th printing unit based on a second virtual moving velocity at an (i+k)-th (wherein k=1, 2, - - - ,≦I−i) printing unit, which is determined by decelerating or accelerating from said first virtual moving velocity at said (i+1)-th printing unit in accordance with said predetermined decelerating or accelerating rate, respectively, and a printing velocity at said (i+k)-th printing unit.

## 4,713,700

## A RECORDING CIRCUIT HAVING MEANS TO AUTOMATICALLY SET THE RECORDING CURRENT OF A MAGNETIC RECORDING HEAD

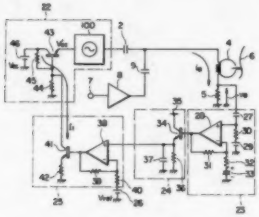
**Kazuyoshi Kuwahara; Isao Fukushima, both of Katsuta; Kuniaki Miura, Ibaraki, and Kenji Kano, Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 8, 1985, Ser. No. 752,859**

**Claims priority, application Japan, Jul. 10, 1984, 59-141326; Jul. 20, 1984, 59-149481**

**Int. Cl.[4] H04N *5/782, 9/79*; G11B *5/45***

**U.S. Cl. 358—315** **15 Claims**



1. A magnetic recording apparatus for recording information on a recording medium through a magnetic head comprising:

recording signal processing means electrically connected to said magnetic head for receiving an input signal representative of said information, and for processing the received input signal so as to generate a recording signal to be supplied to said magnetic head, said recording signal processing means including:

a terminal for receiving an input video signal representative of said video information,

luminance signal extraction means, connected to said terminal, for extracting a luminance signal from said input video signal,

FM modulation means, connected to the output of said luminance signal extraction means, for FM modulating said luminance signal,

chroma signal extraction means connected to said terminal, for extracting a chroma signal from said input video signal,

low-band conversion means for low-band conversion of said chroma signal, and

mixer means, connected to the outputs of said FM modulation means and low-band conversion means, for mixing an FM modulated luminance signal and a low-band converted chroma signal;

detection means connected to said magnetic head for detecting said recording signal passed through said magnetic head and for generating a detection signal representative of said recording signal;

control signal generation means connected to said detection means and being responsive to said detection signal, for generating a control signal, said control signal generation means including:

detection signal conversion means for converting said detection signal into a smoothed DC signal,

comparison means for comparing said smoothed DC signal with a predetermined reference signal and generating said control signal on the basis of a difference between said smoothed DC signal and said predetermined reference signal, and

sync signal extraction means, connected between the output of said detection means and the input of said detection signal conversion means, for extracting said sync signal from a luminance signal component contained in said detection signal;

control means connected to said recording signal processing means and being responsive to said control signal, for controlling said recording signal processing means so as to set the level of said recording signal passed through said magnetic head to a predetermined optimum value, said control means including:

first variable gain amplifying means connected between said FM modulation means and said mixer means for amplifying, by a variable gain, said FM modulated luminance signal,

second variable gain amplifying means, connected between said low-band conversion means and said mixer means, for amplifying, by a variable gain, said low-band converted chroma signal, at least one of said first and second variable gain amplifying means being connected to said control signal so as to control the gain of said at least one of said first and second variable gain amplifying means, said at least one of said first and second variable gain amplifying means being gain controlled its gain by said control signal on the basis of a sync signal.

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## 4,713,701

## PICTURE PRODUCING APPARATUS USING MULTIPLE DOT FORMING UNITS AND RECORDING MATERIALS OF DIFFERENT CONCENTRATIONS

**Hideaki Kawamura, Tokyo; Nobuaki Sakurada, Yokohama; Yuichi Sato, Kawasaki, and Yoshitaka Watanabe, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 530,474, Sep. 8, 1983, abandoned. This application Mar. 24, 1986, Ser. No. 844,244**

**Claims priority, application Japan, Sep. 18, 1982, 57-162662**

**Int. Cl.[4] H04N *1/40***

**U.S. Cl. 358—298** **8 Claims**

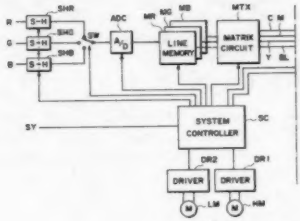
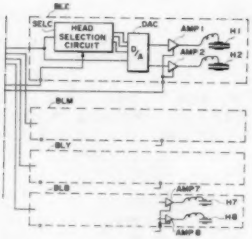



FIG. 5A




1. Picture producing apparatus for forming a picture comprising a plurality of picture elements with different light-reflecting properties providing different optical reflection densities, the apparatus comprising:

a plurality of dot forming units for providing dots of recording material on a medium to form the picture elements, said dot forming units providing dots of a particular color using recording materials with different concentrations, wherein said plurality of dot forming units includes a first dot forming unit capable of providing dots having an optical density in a first range and a second dot forming unit capable of providing dots having an optical density in

a second range at least partially overlapping the first range;

determining means for determining the optical reflection density limits of a plurality of original picture elements of an original to be reproduced corresponding to picture elements of the picture to be produced; and

selecting means responsive to said determining means for selecting only said first dot forming unit to form picture elements when the optical reflection density limits of the original picture elements are within the first optical reflection density range, only said second dot forming unit to form picture elements when the optical reflection density limits of the original picture elements are within the second optical reflection density range, and said first and said second dot forming units to form picture elements when the optical reflection density limits of the original picture elements extend over the first and second optical reflection density ranges.

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**4,713,702**

## DATA COMMUNICATION APPARATUS

**Mitsugu Ishihara, and Yukihiko Machida, both of Shinagawa, Japan, assignors to Sony Corporation, Tokyo, Japan**

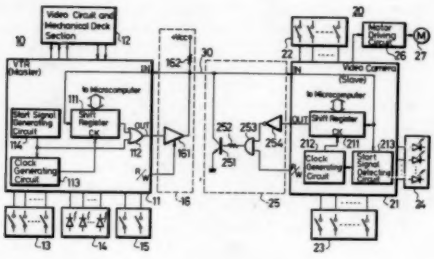
**PCT No. PCT/JP84/00425, § 371 Date May 6, 1985, § 102(e) Date May 6, 1985, PCT Pub. No. WO85/01168, PCT Pub. Date Mar. 14, 1985**

**PCT Filed Sep. 5, 1984, Ser. No. 732,004**

**Claims priority, application Japan, Sep. 5, 1983, 58-163888**

**Int. Cl.⁴ H04N** *5/76;* **G11B** *31/00;* **H04J** *3/06*

**U.S. Cl. 360—79** **9 Claims**




1. A data communication apparatus, in which a bidirectional communication of data is carried out between a master apparatus and a slave apparatus, comprising: a single signal line forming a sole connection between said master apparatus and said slave apparatus, means for arranging a first data transmission period of one apparatus and a second data transmission period of the other apparatus as one block with a first blank period between said first and second data transmission periods containing a start signal from said master apparatus and no data and with a second blank period between successive blocks in which no data except a start signal from said master apparatus is transmitted or received, means for discriminating said transmission period of said one apparatus and said transmission period of said other apparatus from each other and for discriminating said one block from subsequent other blocks, means for controlling the timing of the transmission and reception by said start signal from said master apparatus for use in transmitting a data from said slave apparatus to said master apparatus, in which said start signal is periodically transmitted only from the side of said master apparatus to the side of said slave apparatus prior to the respective starts of said first and second data transmission periods.

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**4,713,703**

## INFORMATION RECORDING AND REPRODUCING APPARATUS

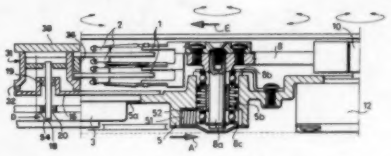
**Isao Asano, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Japan**

**Filed Aug. 26, 1986, Ser. No. 900,502**

**Claims priority, application Japan, Aug. 31, 1985, 60-132437[U]**

**Int. Cl.⁴ G11B** *5/012*

**U.S. Cl. 360—97** **3 Claims**



1. An information recording and reproducing apparatus of the hard disk type, comprising:

a rotatable driving hub supporting an information recording disk for rotation about a vertical axis;

a motor disposed below said driving hub having a driving shaft secured to said driving hub, said driving shaft being supported by upper and lower bearings;

a pivot assembly disposed to one side in a horizontal direction of said driving hub and disk, said pivot assembly having a vertically oriented pivot shaft supported by upper and lower bearings, a swing arm supported on an upper portion of said pivot shaft, and recording and reproducing heads attached to a free end of said swing arm, said heads being movable with said swing arm on said pivot shaft in a track seek direction over respective recording surfaces of the disk;

first biasing means for biasing the lower bearing of said driving shaft in a horizontal direction to compensate for any tilting of said driving shaft due to mechanical error; and

second biasing means for biasing the lower bearing of said pivot shaft in the same horizontal direction as said first biasing means to compensate for any tilting of said pivot shaft due to mechanical error and to limit the relative tilting error between said pivot shaft and said driving shaft to the least extent.

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**4,713,704**

## DISK STORAGE SPINDLE ARRANGEMENT

**Horst Voll, Hassfurt, Fed. Rep. of Germany, and Manfred Meyer, Stamford, Conn., assignors to FAG Kugelfischer Georg Schafer (KGaA), Fed. Rep. of Germany**

**Filed Dec. 13, 1985, Ser. No. 808,881**

**Claims priority, application Fed. Rep. of Germany, Dec. 19, 1984, 3446269; Nov. 14, 1985, 3540363**

**Int. Cl.⁴ G11B** *17/02*

**U.S. Cl. 360—97** **10 Claims**

1. A spindle assembly for use with a magnetic disk, or the like, comprising:

a rotatable shaft having a first end and a second end and further having an area of a stepped-down, reduced cross-sectional area adjacent said second end;

a housing having said rotatable shaft disposed therethrough;

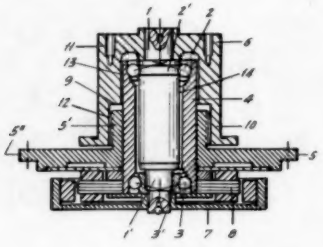
a receiving part having a bore therein and being disposed adjacent said first end of said shaft, said receiving part being for receiving said magnetic disk, or the like;

a drive motor disposed at said second end of said shaft;

first and second axially spaced apart bearings, said first bearing being disposed adjacent said first end of said shaft, said first bearing having an inner race portion which is disposed at said shaft, said second bearing disposed at said stepped down area adjacent said second end of said shaft

and being axially displaceable in relation to said stepped-down area;

outer ring means connecting said first and said second bearings together in an axially spaced relationship established by said outer ring means; said outer ring means extending into said bore of said receiving part and contacting said receiving part in the axial region near said first bearing,



said bore being sized so that said receiving part is radially spaced outward from said outer ring means in the axial region away from said first bearing; and

a housing fixedly attached to said outer ring means adjacent said second bearing and having an axial portion disposed in said bore of said receiving part in said axial region away from said first bearing such that said axial portion extends between said outer ring means and said receiving part.

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**4,713,705**

## MEANS AND METHODS FOR IMPROVED TRANSDUCING OF FLEXIBLE DISK PACKS

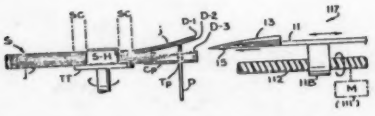
**Dean DeMoss, Camarillo, and Herbert U. Ragle, Thousand Oaks, both of Calif., assignors to Unisys Corp., Detroit, Mich.**

**Continuation of Ser. No. 45,718, Jun. 5, 1979, Pat. No. 4,291,349, which is a continuation of Ser. No. 922,026, Jul. 5, 1978, abandoned, which is a continuation-in-part of Ser. No. 711,628, Aug. 4, 1976, Pat. No. 4,134,143. This application Jun. 18, 1981, Ser. No. 274,791**

**The portion of the term of this patent subsequent to Apr. 25, 1995, has been disclaimed.**

**Int. Cl.[4] G11B** *23/02, 25/04*

**U.S. Cl. 360—98** **13 Claims**



1. An improved partitionable disk record system including:

a disk pack comprising a stack of flexible recording disks adapted to be co-rotated and partitioned "end-wise" to present at least one prescribed partition gap, each gap exposing, at least partially, a selected disk recording surface for transducer entry;

transducer assembly means adapted to be selectably projected into an associated one of said gaps and maintain the gap, partitioningly, while presenting at least one transducer-head means into transducing relation with a respective selected recording surface; this assembly means including:

transducing actuator means adapted to selectively translate said transducer assembly means into, and out of, said associated gap; and,

transducer control means arranged and adapted to so translate the assembly means responsive to detection of said partitioning of the "selected" gap.

**4,713,706**

## DEVICE FOR MOUNTING MAGNETIC HEAD

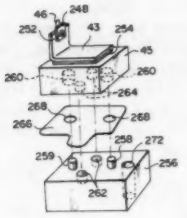
**Sigenori Oosaka, and Kenji Negishi, both of Ashigarakami, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Filed Oct. 2, 1985, Ser. No. 782,898**

**Claims priority, application Japan, Oct. 5, 1984, 59-151114[U]**

**Int. Cl.[4] G11B** *5/50, 5/56, 21/24, 21/26*

**U.S. Cl. 360—104** **4 Claims**



1. A device for mounting a magnetic head to a head carriage, said carriage being arranged to move said head in the radial direction of a rotating magnetic disc for recording onto or reproducing from said magnetic disc, said device comprising:

a block solidly secured to said magnetic head;

positioning means for aligning said block with said head carriage, said positioning means including at least two positioning projections formed on one of said block and said head carriage and positioning holes for receiving said positioning projections formed on the other of said block and said head carriage; and

magnet attracting means for securing said block to said head carriage, said magnet attracting means including magnets for biasing said positioning projections against walls of said positioning holes in a direction parallel to the plane of said magnetic disc, said magnets being secured to facing planar surfaces of said block and said head carriage, the magnets secured to the block being offset from the magnets secured to the head carriage in the direction parallel to the plane of the magnetic disc so that an attractive force between complementary magnets includes components parallel and perpendicular to said direction.

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**4,713,707**

## TRACKING MOUNT FOR A CONTACTLESS RECORDING AND/OR REPRODUCING HEAD

**Frieder Heizmann, Denens, Switzerland, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Oct. 21, 1985, Ser. No. 789,614**

**Int. Cl.[4] G11B** *5/55, 21/08*

**U.S. Cl. 360—106** **2 Claims**

1. Device for movably mounting and for controllably moving a recording and/or reproducing flying transducer contactlessly across the surface of a record medium for selection of record or recording tracks on said medium and for tracking adjustment, comprising:

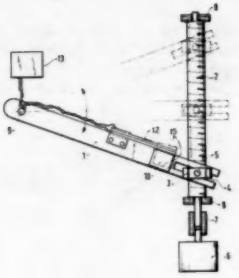
a swingable arm pivoted at a first end thereof and holding a said transducer near a second end thereof, said arm being pivoted so as to swing said transducer across said record medium at a constant spacing therefrom;

a lead-screw spindle having a threaded rider collar thereon slidably constrained so as to be propelled rectilinearly by rotation of said spindle, said spindle being mounted in bearings disposed so as to enable said rider to hold contact with said arm near said second end thereof over an operating swing range of said arm;

a close-fitting pin-and-cavity sliding linkage between said rider collar and said pivoted arm near said second end

thereof for causing swinging of said pivoted arm in response to rotation of said lead-screw spindle;

means including an electric motor for controllably rotating said lead screw spindle, and



piezoelectric means for shifting at least part of said transducer relative to said arm, whereby preliminary setting of said transducer on a track may be produced by driving said arm by rotating said lead-screw spindle and precision of tracking can be produced by shifting said transducer relative to said arm.

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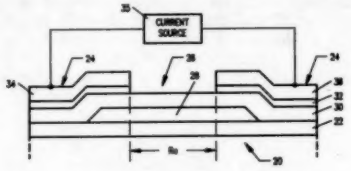
**4,713,708**

## MAGNETORESISTIVE READ TRANSDUCER

**Mohamad T. Krounbi, San Jose, and Otto Voegeli, Morgan Hill, both of Calif., assignors to International Business Machines, Armonk, N.Y.**

**Filed Oct. 31, 1986, Ser. No. 926,076**
**Int. Cl.[4] G11B *5/30***
**U.S. Cl. 360—113** **13 Claims**




1. A magnetic read transducer assembly comprising:

a thin film of magnetoresistive conductive layer formed of magnetic material, said magnetoresistive conductive layer having end regions separated by a central region;

a nonmagnetic decoupling layer covering only said central region of said magnetoresistive conductive layer;

a thin film of soft magnetic material extending over said end regions and said central region of said magnetoresistive conductive layer, said thin film of soft magnetic material being parallel to and in contact with said decoupling layer and separated from said magnetoresistive layer in said central region by said decoupling layer, said thin film of soft magnetic material being in contact with said magnetoresistive layer in said end regions to form end region magnetic assemblies;

means for producing a longitudinal bias, said means for producing a longitudinal bias being in direct contact with each of said end region magnetic assemblies to produce a longitudinal bias in said end regions only of a level sufficient to maintain said end region magnetic assemblies in a single domain state, said single domain states of said end region magnetic assemblies thereby inducing a single domain state in said central region of said magnetoresistive conductive layer;

spaced conductor means electrically connected to said magnetoresistive layer within said central region; and

means for supplying a bias current to said conductive means to magnetically bias said magnetoresistive layer with transverse bias in the part of said central region in which said bias current and said decoupling layer are both present, said transverse bias being of a level sufficient to maintain said magnetoresistive layer in a high sensitivity condition whereby, upon connection of said conductive means to a signal sensing means, said signal sensing means determining the resistance changes in said magnetoresistive layer as a function of the fields which are intercepted by said magnetoresistive layer.

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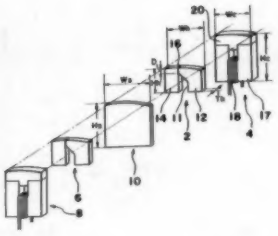
**4,713,709**

## TWIN HEAD FOR ELECTRONIC STILL CAMERA AND A METHOD FOR MAKING THE SAME

**Isao Yasuda, Katano; Yorinobu Yoshisato, Hirakata; Hideki Yoshikawa, Osaka, and Kazuhiko Taketa, Hirakata, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan**

**Filed Jul. 31, 1985, Ser. No. 760,796**
**Claims priority, application Japan, Aug. 7, 1984, 59-165314**
**Int. Cl.[4] G11B *5/255, 5/29***
**U.S. Cl. 360—121** **8 Claims**



1. A twin head for use in an electronic still camera comprising:

a shield plate;

a first head chip member having an elongated face that faces a recording medium and a magnetic gap defined at an intermediate portion of said elongated face, said first head chip having a thickness of about 60 micrometers, the length Wh of said elongated face being such that

0.3 millimeter $\leqq$ Wh $\leqq$ 1 millimeter

a second head chip member having an elongated face that faces a recording medium and a magnetic gap defined at an intermediate portion of said elongated face, said second head chip member having a thickness of about 60 micrometers, the length of Wh of said elongated face being equal to that of said first head chip member;

a first reinforcing core member having a magnetic portion with a coil opening therein and a non-magnetic portion facing the recording medium, and a coil wound around said coil opening;

a second reinforcing core member having a magnetic portion with a coil opening therein, and a non-magnetic portion facing the recording medium, and a coil wound around said coil opening of said second reinforcing core, wherein each of said first and second reinforcing core members has an elongatede face which is flush with said elongated faces of said first and second head chip members;

said first and second head chip members being provided on opposite sides of said shield plate, said first reinforcing core member being provided on one side of said first head chip member remote from said shield plate, and said second reinforcing core member being provided on one side of said second head chip member remote from said shield plate, such that said elongated faces of said first and sec-

ond head chip members are flush with each other and that said magnetic gaps of said first and second head chip members are aligned with respect to each other.

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**4,713,710**

**COMPACT MULTIPLE MAGNETIC HEAD APPARATUS**

**Yutaka Soda, Tokyo; Hideko Imamura, Ibaragi; Hiroyuki Uchida, and Tetsuo Sekiya, both of Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

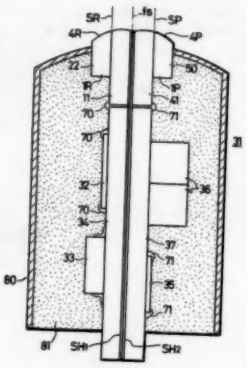
**PCT No. PCT/JP85/00351, § 371 Date Feb. 25, 1986, § 102(e) Date Feb. 25, 1986, PCT Pub. No. WO86/00456, PCT Pub. Date Jan. 16, 1986**

**PCT Filed Jun. 21, 1985, Ser. No. 833,396**

**Claims priority, application Japan, Jun. 25, 1984, 59-130718**

**Int. Cl.[4] G11B** *5/31, 5/105, 5/265*

**U.S. Cl. 360—121** **1 Claim**




1. A combination magnetic head apparatus characterized in that a recording head portion in which on one surface of a first magnetic shield plate there are located a recording magnetic head element portion, a recording integrated circuit and a capacitor and a reproducing head portion in which on one surface of a second magnetic shield plate there are located a reproducing magnetic head element portion, a reproducing integrated circuit and a capacitor are bonded together on the other surfaces of said first and second magnetic shield plates and the overall arrangement thereof is incorporated into a shield case, wherein said recording magnetic head element portion includes a thin film magnetic head element formed on a magnetic substrate bonded to said first magnetic shield plate, a protective substrate is bonded thereto so as to cover the same, said reproducing magnetic head element portion includes a thin film magnetic head element formed on a substrate bonded to said second magnetic shield plate, a protective substrate is bonded thereto so as to cover the same, said recording head portion and said reproducing head portion are respectively provided with magnetic medium contact surfaces by cylindrical polishing around a polishing center displaced from an extension of the depth directions of the magnetic gaps.

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**4,713,711**

**THIN FILM MAGNETIC TRANSDUCER HAVING CENTER TAPPED WINDING**

**Robert E. Jones, Jr., San Jose; Rodney E. Lee, Aromas, and Tsu-Hsing Yeh, San Jose, all of Calif., assignors to International Business Machines, Armonk, N.Y.**

**Filed May 8, 1985, Ser. No. 731,690**

**Int. Cl.[4] G11B** *5/17*

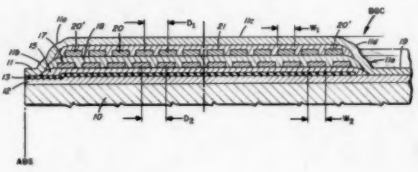
**U.S. Cl. 360—123** **10 Claims**

1. A thin film magnetic transducer including

first and second pole piece elements having a coplanar tip portion, a transition region comprising a diverging portion to define a spaced apart winding enclosure, and a back gap closure for completing a magnetic circuit;

a first planar and continuous winding of electrically conductive material extending into said enclosure, and insulated from said pole piece elements, said first winding having a plurality of conductor segments each of a first constant spacing;

a second continuous winding of electrically conductive material extending into said enclosure, parallel to said first winding and insulated from said first winding and from said pole piece elements, said second winding having a




plurality of conductor segments of a second constant spacing; and

said conductor segments of said first and second winding having different center to center spacings and different widths, whereby the same number of conductor segments in each of said first and said second winding may be arranged in parallel planes within said enclosure without interfering with said transition region, and whereby the electrical characteristics, comprising both resistance and inductance, of each of said first and said second winding are substantially the same.

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**4,713,712**

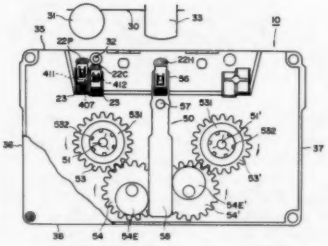
**CASSETTE TYPE CLEANING DEVICE FOR THE CLEANING OF PLAYING/RECORDING HEAD, ERASING HEAD, AND CAPSTAN/PINCH ROLLER**

**Ta-Chin Chou, 75, Hwa-Sheng Street, Shin-Lin, Taipei, Taiwan**

**Filed Jun. 2, 1986, Ser. No. 869,411**

**Int. Cl.[4] G11B** *5/41*

**U.S. Cl. 360—128** **8 Claims**

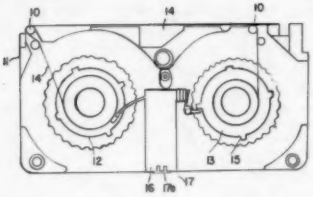



1. A cassette type cleaning device for cleaning the playing-/recording head, the erasing head, and the capstan/pinch roller, comprising a housing, socket means for engaging said capstan, said pinch roller, said playing/recording head, and said erasing head, each of said socket means having lock means, cleaning tip assemblies within the housing, each of said assemblies including: a cotton tipped match-like stick, a tubular retainer having an outer wall, said cotton tipped, match-like stick being securely inserted into the inner space of said tubular retainer; the inner wall of the retainer being downwardly tapered so as to tightly hold said stick match therein, said retainer having an orifice at the bottom to facilitate removal of the cotton tipped stick, a resilient U-shaped tongue with protruding member on one side of the outer wall of the retainer, an upper and a lower cut on the opposite side of said outer wall, for engagement with said lock means of said socket means.

## 4,713,713
## CLEANING TAPE CARTRIDGE USED IN VIDEOTAPE RECORDERS

**Siat-Ling Lu, No. 6, Alley 27, Lane 629, Nei-Hu Road, Taipei, Taiwan**

**Filed May 8, 1985, Ser. No. 731,735**
**Int. Cl.[4] G11B** *5/10*
**U.S. Cl. 360—128** **10 Claims**




1. A cleaning tape cartridge adapted to be inserted into a videotape recorder to clean the magnetic head of said recorder, said cleaning tape cartridge comprising:

(a) a cleaning tape adapted to traverse a path through said cartridge;

(b) a tape supply reel located adjacent a first end of said tape traversing path, said tape adapted to be unwound from said supply reel;

(c) a take-up reel located adjacent a second end of said tape traversing path, said tape adapted to be wound about said take-up reel; and

(d) a container adapted to contain cleaning solution, means for conducting said cleaning solution from said container, and means for applying said solution to said tape in even amounts as said tape is unwound from said supply reel, wherein said means for conducting said cleaning solution from said container and said means for applying said solution to said tape includes tubing having a first end attached to a first side wall of said container, said tubing having a second end which is attached to a liquid applicator, said liquid applicator abutting said tape on said supply reel and comprising means for applying said solution in even amounts to said tape as it is unwound from said supply reel, said cleaning container further comprising a second side wall and a compressible portion located on said second side wall, opposite to said first side wall of said container to which said tubing is attached, said compressible portion comprising means for forcing said liquid solution from said container, through said tubing and into said applicator, said device further comprising a pivotable guide bar which is pivoted during rotation of said take-up reel and which includes means for compressing said compressible portion of said container when said take-up reel rotates.

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## 4,713,714
## COMPUTER PERIPHERAL SHOCK MOUNT FOR LIMITING MOTION-INDUCED ERRORS

**John E. Gatti, Scottsdale, and Carl R. Tarver, Phoenix, both of Ariz., assignors to Motorola Computer Systems, Inc., Cupertino, Calif.**

**Filed Nov. 26, 1985, Ser. No. 801,886**
**Int. Cl.[4] G11B** *17/02, 33/08;* **F16M** *13/00*
**U.S. Cl. 360—137** **14 Claims**

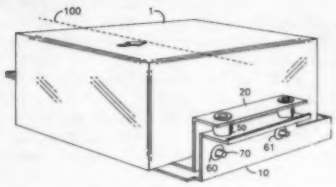
1. A computer peripheral shock mount comprising:

a computer peripheral housing enclosing a computer peripheral;

a cradle member accommodating said housing;

a mounting plate accommodating said cradle member; and

limiting means for coupling said housing to said mounting plate, said limiting means comprising protuberant means on said cradle member and means on said mounting plate for receiving said protuberant means;




whereby said computer peripheral is isolated from physical vibration shocks incurred by said mounting plate.

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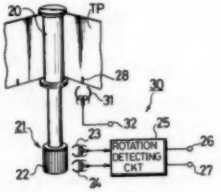
## 4,713,715
## TAPE POSITION DISPLAY APPARATUS USING COUNTER ROLLER PULSES AND CTL PULSES

**Fumiyoshi Abe, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed Oct. 30, 1985, Ser. No. 792,850**
**Claims priority, application Japan, Oct. 31, 1984, 59-229713**
**Int. Cl.[4] G11B** *15/18*
**U.S. Cl. 360—137** **5 Claims**




1. Tape position display apparatus comprising:

first generating means for generating first electrical pulses in response to transport of a tape;

counter means for making a count of said first electrical pulses;

second generating means for generating, in response to said transport, second electrical pulses from a control track signal recorded on said tape, said first electrical pulses normally occurring at a frequency which is an integral multiple of the frequency of said second electrical pulses;

means including a subtracter responsive to said count for producing an output representative of a modular count, for detecting a phase difference between a particular value of said modular count and a particular one of said second pulses, and for making adjustments in the value of said modular count, each such adjustment being independent of the magnitude of said phase difference and in such a direction as to reduce said magnitude; and

tape position display means for displaying tape position in partial dependence on the value of said modular count.

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## 4,713,716
## DETECTION DEVICE FOR CONTACT FUSION IN AN ELECTROMAGNETIC CONTACTOR

**Koichi Takemura, Takatsuki, and Tadashi Shiomi, Osaka, both of Japan, assignors to Kabushiki Kaisha Kamiuchi Denki Seisakusho, Osaka, Japan**

**Filed May 15, 1986, Ser. No. 863,993**
**Claims priority, application Japan, May 15, 1985, 60-103160**
**Int. Cl.[4] H02H** *3/00, 7/00*
**U.S. Cl. 361—2** **4 Claims**

1. A contact fusion detection device in an electromagnetic contactor used with an electric motor conducting inching or plugging, comprising:

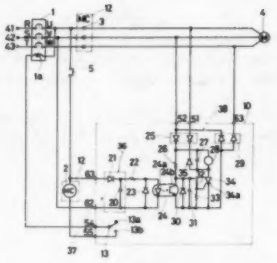
an electromagnetic contactor having main contacts and electromagnetic contactor coil, said electromagnetic contactor coil operating said main contacts;

a detecting means for detecting a voltage supplied to said electromagnetic contactor coil, said detecting means being disposed ahead of said main contacts of said electromagnetic contactor;

a detecting means for detecting a voltage supplied to said electric motor, said detecting means being disposed after said main contacts of said electromagnetic contactor;

an ON-OFF means and a relay coil for contact fusion detection, said ON-OFF means supplying and interrupting the supply of an electrical current to said relay coil for contact fusion detection and comprising a portion of said detection means for detecting said motor voltage;

a photocoupler means for connecting said voltage detection



means for detecting said voltage applied to said electromagnetic contactor coil to said voltage detection means for detecting said voltage applied to said electric motor;

said ON-OFF means including an ON-OFF control means, voltage changes across said electromagnetic contactor coil being supplied to said ON-OFF control means via said photocoupler means;

a breaker means having a tripping coil, said breaker means being connected between a source of power and said main contacts of said electromagnetic contactor;

a detection relay means connected to said tripping coil of said breaker and connected to said means for detecting said voltage applied to said electric motor, wherein said contact fusion detection relay means is operated so as to supply a voltage to said tripping coil of said breaker so as to thereby open said breaker upon the detection of contact fusion.

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**4,713,717**

**PROTECTED REFRIGERATOR COMPRESSOR MOTOR SYSTEMS AND MOTOR PROTECTORS**

**Radi Pejouhy, Marshfield, Mass.; Joseph G. Nield, Jr., Cumberland, R.I.; John R. D'Entremont, Foxboro; Beggs, Louis C., Attleboro, both of Mass., and Fabrizio Rotulo, Napoli, Italy, assignors to Texas Instruments, Dallas, Tex.**

**Filed Nov. 4, 1985, Ser. No. 794,876**

**The portion of the term of this patent subsequent to Nov. 10, 2004, has been disclaimed.**

**Int. Cl.[4] H02H** *3/08, 5/04*

**U.S. Cl. 361—26** **15 Claims**

1. A current and temperature responsive motor protector to be mounted in a selected manner on an electrical motor for providing both short time trip and ultimate trip protection for the motor comprising

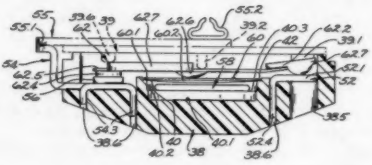
a base,

first contact means on the base normally engaging complementary contact means to close a motor circuit, the first contact means being movable to disengage the complementary contact means to open the circuit,

thermostat metal means mounted on the base to be disposed in selected thermal coupling to the motor when the protector is mounted on the motor in said manner, the thermostat metal means being actuatable when heated to a selected temperature to move the first contact means to open the circuit, and

electrical resistance heater means responsive to increases in motor current on the occurrence of either short time trip or ultimate trip fault conditions in the motor for heating the thermostat metal means to said selected temperature, characterized in that

the electrical resistance heater means is formed of a material having a positive temperature coefficient of resistivity arranged to carry the motor current, the material of the heater means being selected to display a first electrical resistance in response to normal motor currents in the heater means, a second relatively higher electrical resis-



tance in response to ultimate trip motor current in the heater means, and a third substantially higher electrical resistance in response to short time trip motor current in the heater means, the heater means being proportioned and arranged with selected thermal coupling to the thermostat metal means to cooperate with the positive temperature coefficient of resistivity and the thermal coupling of the thermostat metal means to the motor to display said first resistance and permit normal running operation of the motor in response to normal motor currents in the heater means, to display said second resistance and heat the thermostat metal means to said selected temperature in response to ultimate trip currents in the heater means, and to display said third resistance and heat the thermostat metal means to said selected temperature in response to short time trip current in the heater means.

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**4,713,718**

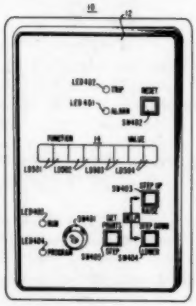
**MICROPROCESSOR BASED MOTOR PROTECTIVE RELAY WITH MAXIMUM NUMBER OF STARTS PER TIME INTERVAL LIMITER**

**Bruce R. Quayle, Asheville, N.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Mar. 31, 1987, Ser. No. 32,885**

**Int. Cl.[4] H02H** *5/04*

**U.S. Cl. 361—29** **4 Claims**



1. Electrical apparatus capable of being started to perform a

function provided that a maximum number of starts is not exceeded in a predetermined time interval (HSTRT), comprising:

control means for issuing a start command;

memory means cooperable with said control means for having stored therein sequential start time values each representative of a time difference between the occurrence of a predetermined start and sequential starts thereafter, the first of said start time values being defined as the oldest start time value and the next in sequence of said start time values being defined as the next oldest start time value;

counter means cooperable with said control means for keeping track of the number of starts;

timer means cooperable with said control means and said memory means for keeping track of the running Time (T) after said predetermined start;

comparison means cooperable with said control means, said counter means, said memory means and said timer means for comparing said running time (T) against said predetermined time value (HSTRT) and for providing an indication when said running Time is equal to or greater than said predetermined time value (HSTRT);

function means cooperable with said control means, said memory means, said counter means, said timer means and said comparision means for performing the following when said time (T) equals or exceeds said predetermined time value (HSTRT):

decrementing said running time and all said sequential start time values by said oldest start time value;

discarding said oldest start time value;

redefining in said memory means said thusly decremented next to the last oldest start time value as the oldest start time value;

decrementing said counter means by one start;

calculating means cooperable with said control means, said counter means and said memory means for allowing a start command to issue if said number of starts in said counter means does not exceed said maximum number of starts.

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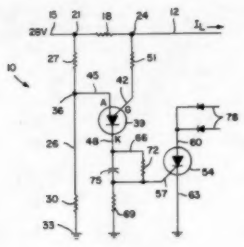
**4,713,719**

## FAST ACTING OVERCURRENT PROTECTOR AND METHOD

**Michael M. Kugelman, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio**

**Filed Feb. 7, 1986, Ser. No. 826,960**
**Int. Cl.[4] H02H 9/02**
**U.S. Cl. 361—54** **8 Claims**




1. A sourcing system overcurrent protector configured for action in less than one microsecond in a solid state circuit including a current conduit having a corresponding supply voltage and configured to flow current to a load, comprising: a sensing means and crow-bar means, the sensing means being configured for triggering the crow-bar means; the sensing means including a programmable unijunction transistor (PUT) having anode, gate and cathode electrodes, a primary resistor positioned in the current conductor of a size configured to produce a predetermined voltage drop across the primary resistor when current flowing therethrough exceeds a desired value; a programming means for providing the PUT anode electrode with a voltage value at which it is desired the PUT shall activate; a means whereby the gate of the PUT detects a voltage in a current flow direction downstream of the primary resistor; the crow-bar device having anode, cathode and gate electrodes, the crow-bar device gate electrode and the PUT cathode electrode being joined through signal differentiating circuit the signal differentiating circuit including a capacitor and being configured whereby not later than upon completion of charging of the capacitor, electrical flow through the PUT is terminated, and the signal differentiating circuit being joined through electrical resistance to a point of low reference voltage in the solid state circuit; one of the crow-bar device anode and cathode electrodes being joined to control electrode means for current consuming/switching devices contained in the solid state circuit and the other crow-bar device electrode being connected to a voltage in the solid state circuit.

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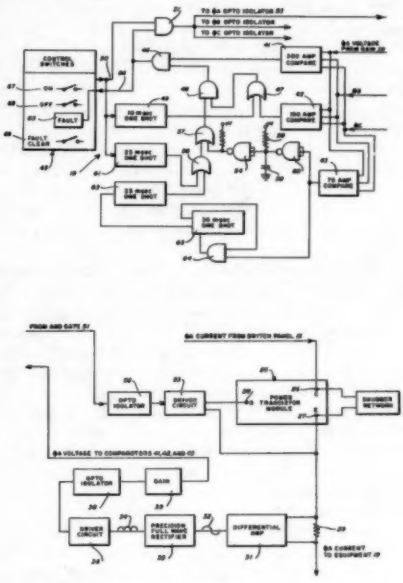
**4,713,720**

## FAST ACTING SOLID STATE AC CIRCUIT BREAKER

**Robert T. Rogers, Blacksburg, Va., and James C. Siewert, Mobile, Ala., assignors to Litton Systems, Inc., Blacksburg, Va.**

**Filed May 14, 1986, Ser. No. 862,958**
**Int. Cl.[4] H02H 7/20**
**U.S. Cl. 361—97** **15 Claims**







1. An AC circuit breaker comprising:

a three terminal solid state device which may be turned On and Off;

a current path through the AC circuit breaker comprising the solid state device;

means for sensing current through the AC circuit breaker;

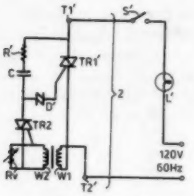
comparator means establishing a plurality of time related threshold current levels for the AC circuit breaker which are effective during successive periods of time; and

means for turning the solid state device from On to Off in less than 10 microseconds in response to current in the AC circuit breaker which exceeds one of the threshold current levels.

## 4,713,721
## LIGHTING FIXTURE OVERLOAD PROTECTOR

Kosta Pelonis, Bradford, Canada, assignor to Doric Electronic Laboratories Ltd., Bradford, Canada

Filed Feb. 27, 1985, Ser. No. 706,467
Claims priority, application Canada, Mar. 2, 1984, 448762
Int. Cl.[4] H02H 3/08
U.S. Cl. 361—100 3 Claims




1. A two-terminal AC device which can be series connected with a lighting fixture having a predetermined power rating and operable from a line source of predetermined AC voltage to prevent overheating of the fixture in an overload condition, comprising:

first bidirectional self-extinguishing switching means for conducting current between the two device terminals, the switching means having a control terminal at which a triggering signal can be applied to trigger conduction by the first switching means;

a conductive path so coupling the control terminal of the first bidirectional switching means to one of the device terminals that triggering signals are applied to the control terminal of the first switching means in response to voltage differences generated between the two device terminals;

a second bidirectional self-extinguishing switching means for so coupling the conductive path to the other of the two device terminals, when the second switching means is conductive, that conduction of the first switching means is suppressed, the second switching means having a control terminal at which a signal can be applied to trigger conduction of the second switching means;

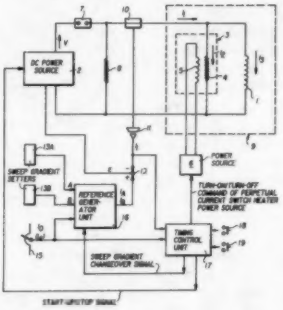
a transformer having a primary winding and a secondary winding, the primary winding being coupled to the first switching means such that the current between the two device terminals flows through the primary winding, the secondary winding being coupled to an impedance such that the secondary current generates a voltage signal and being coupled to the control terminal of the second switching means such that the voltage signal is applied to the control terminal of the second switching means, the transformer ratio and the impedance coupled to the secondary winding being so selected that the generated voltage signal triggers conduction by the second switching means when the current conducted between the two device terminals exceeds a predetermined level;

the conductive path having a phase-shifting impedance which delays current conduction in the second switching means relative to current conduction in the first switching means such that, when the current between the two-device terminals exceeds the predetermined level, triggering of the second switching means delays conduction by the first switching means thereby reducing the mean value of the current delivered to the fixture.

## 4,713,722
## SUPERCONDUCTING SYSTEM AND METHOD FOR CONTROLLING THE SAME

Eiji Toyoda, Wako, and Soichiro Hayashi, Hino, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 17, 1986, Ser. No. 886,315
Claims priority, application Japan, Jul. 20, 1985, 60-160847; Feb. 18, 1986, 61-31821
Int. Cl.[4] H01H 47/00
U.S. Cl. 361—141 16 Claims




1. A superconducting system having a perpetual current switch incorporated within a cryogenic vessel and including a superconductive lead connected in parallel with a superconductive coil and a heater disposed in the vicinity of said superconductive lead, said perpetual current switch forming a current loop together with said superconductive coil, a superconductive coil power source installed outside said cryogenic vessel to supply a current to said current loop, and a heater power source that energizes said heater, said system circulating a current of a specified amount into said current loop so as to create a perpetual current loop, said system comprising:

means for establishing sweep gradients, comprising a first current reference with a first sweep gradient that changes a superconducting coil current, and a second current reference with a second sweep gradient that does not change said superconductive coil current but changes currents that flow respectively into said superconductive coil power source and said superconductive lead;

means for establishing a target current that flows through said superconductive coil; and

control means for switching said first and second current references with predetermined changeover timings in accordance with desired operation modes of said system.

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## 4,713,723
## ISOLATION TRANSFORMER

Lance R. Kaufman, 131 N. White Oak Way, Mequon, Wis. 53092

Filed Jul. 1, 1986, Ser. No. 880,707
Int. Cl.[4] H03K 3/00
U.S. Cl. 361—179 5 Claims

1. In combination with a semiconductor switch integrated on a semiconductor substrate and having a pair of main terminals and having a gate terminal gating said switch into conduction to conduct current between said main terminals when a gating signal is applied to said gate terminal, an isolation transformer comprising:

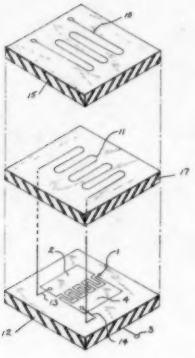
first electrically insulating layer means formed on the top of said substrate;

a transformer secondary conductor formed on the top of said first electrically insulating layer means and connected at one end to said gate terminal and at the other end to one of said main terminals;

second electrically insulating layer means formed on said

first electrically insulating layer means over said secondary conductor;

a transformer primary conductor formed on said second insulating layer means proximate said secondary conductor, such that current flow through said primary conductor induces current in said secondary conductor to provide said gating signal, wherein flux lines couple between said primary and secondary conductors to provide transformer action through said second insulating layer means therebetween.



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**4,713,724**

**PORTABLE ION GENERATOR**

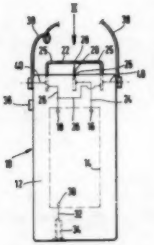
**Helmut Voelkel, Bayreuth, Fed. Rep. of Germany, assignor to HV Hofmann and Volkel, Bayreuth, Fed. Rep. of Germany**

**Filed Jun. 30, 1986, Ser. No. 880,064**

**Claims priority, application Fed. Rep. of Germany, Jul. 20, 1985, 3502021**

**Int. Cl.[4] H01T *23/00*; A61N *1/44***

**U.S. Cl. 361—231** **8 Claims**



1. A portable ion generator comprising a housing, a high-tension source in the housing, a high-tension needle electrode connected to said source and arranged to project from the housing, a counterelectrode arranged to project from the housing at the same side as the needle electrode and disposed around said needle electrode at a spacing therefrom, means connecting said counterelectrode to said source, an electrically conductive support element, and means electrically conductively connecting said support element to said counterelectrode.

**4,713,725**

**DEFENSIVE SYSTEM FOR USE AGAINST HOSTILE ELEMENTS**

**Menahem Kroll, Doar Na Ma'ale Hagalil, Mizpeh Abirim, Israel**

**Filed Jul. 28, 1986, Ser. No. 890,909**

**Claims priority, application Israel, Mar. 25, 1986, 78252**

**Int. Cl.[4] H02H *5/12***

**U.S. Cl. 361—232** **3 Claims**

1. A defensive system for use against hostile elements in a motor vehicle, comprising:

at least one seat cover of the motor vehicle formed of a cloth fabric having secured thereto first and second main electrical conductors, first and second sets of flexible, substantially uninsulated branch electrical conductors secured to said fabric and respectively electrically connected to and traversely directed with respect to said main conductors and spaced apart along the lengths thereof with said first branch conductors interleaved with respect to said second branch conductors and spaced therefrom,

a pulsed electric power supply, and

switch control means operable by a driver of the motor vehicle for coupling opposite poles of said power supply to said main conductors of the fabric of each said car seat cover so as to create between adjecent first and second branch conductors a high, intermittent potential difference designed to be short-circuited upon contact by a hostile element.

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**4,713,726**

**DIELECTRIC CERAMIC COMPOSITION**

**Kazuo Sasazawa, Tokyo, Japan, assignor to Taiyo Yuden Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 24, 1986, Ser. No. 889,647**

**Claims priority, application Japan, Jul. 29, 1985, 60-167172**

**Int. Cl.[4] C04B *35/46***

**U.S. Cl. 361—321** **4 Claims**

2. In a ceramic capacitor having a dielectric layer made of a ceramic composition, the improvement comprising: said ceramic composition consists essentially of (A) 100 parts by weight of a mixture of 7 to 25 mole % of $BaTiO_3$, 0.1 to 15 mole % of $Bi_2O_3$, 50 to 65 mole % of $TiO_2$, 0.1 to 5 mole % of $LaO_{3/2}$ and 15 to 45 mole % of $NdO_{3/2}$ in a total amount of 100 mole % as main components, (B) from 0.1 to 5 parts by weight, per 100 parts by weight of said main components (A), of at least one member selected from the group consisting of $Y_2O_3$, $Gd_2O_3$ and $CeO_2$, and (C) from 0.01 to 1.0 part by weight, per 100 parts by weight of said main components (A), of at least one member selected from the group consisting of $Cr_2O_3$, $MnO_2$, NiO and CoO.

4,713,727

## ELECTROMECHANICAL COMPONENT WITH SEALED HOUSING

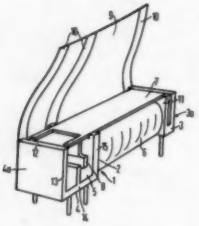
Rolf D. Kimpel, Berlin, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 20, 1986, Ser. No. 920,721

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1985, 3538621

Int. Cl.[4] H05K 5/03

U.S. Cl. 361—334 8 Claims



1. An electromechanical component, having a base body which includes at least one switch chamber containing movable parts and at least one further mounting chamber containing stationary parts and filled with casting compound, and having a housing which surrounds the component in cuboid fashion, whereby an open housing side is in communication with the further mounting chamber and is closed by filling the casting compound in such that, after the casting, the switch chamber is closed fluid-tight both from the outside as well as from the further mounting chamber, said mounting chamber being closed by the housing and the casting compound, comprising the improvement wherein at least two of the closed housing sides positioned perpendicular to one another are formed by a foil glued onto the base body and bent off over at least one edge, whereby the base body forms bending edges as well as all around seating surfaces for the foil in the edge regions of at least one of the switch chamber and the mounting chamber.

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4,713,728

## LIGHTING CIRCUIT BREAKER PANELBOARD MODULAR ASSEMBLY

Rodney D. Raabe; Joseph J. Mrowka; Jon P. McCuin, all of Bristol, and Joseph F. Noonan, Manchester, all of Conn., assignors to General Electric Company, New York, N.Y.

Division of Ser. No. 705,454, Feb. 25, 1985, Pat. No. 4,631,634. This application Aug. 4, 1986, Ser. No. 892,605

Int. Cl.[4] H02H 9/00

U.S. Cl. 361—363 6 Claims

1. A circuit breaker panelboard assembly comprising:

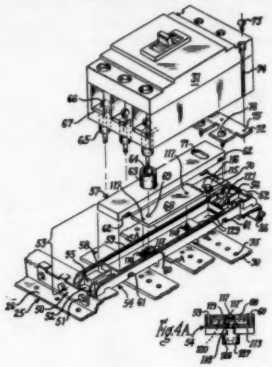
closure means housing at least one main circuit breaker and at least one branch circuit breaker;

access means movably arranged on said closure means providing access to said main and said branch circuit breaker from outside of said closure;

mounting means within said closure means supporting said branch circuit breaker and providing electrical connection between said branch circuit breaker and electrical bus bars within said closure means connectable with an external circuit; and

shield means intermediate said access means and said main and branch circuit breakers preventing contact with electrical terminals on said main and branch circuit breakers;

said mounting means comprising an adapter member having an insulative cover and an insulative base, said adaptor cover having first means integrally formed therein providing access to means electrically connecting said branch



circuit breaker with a branch strap within said adapter base.

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4,713,729

## DEVICE FOR AVOIDING LOCAL OVERHEATING ON MEASURING TRANSDUCERS

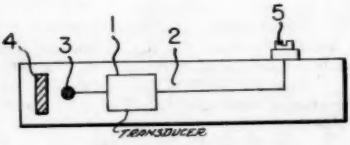
Kurt Eiermann, Pfungstadt, and Karl Ehinger, Karlstein, both of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft Corporation, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 798,799, Nov. 15, 1985, abandoned. This application Mar. 19, 1987, Ser. No. 28,058

Claims priority, application Fed. Rep. of Germany, Nov. 30, 1984, 3443702

Int. Cl.[4] H05K 7/20

U.S. Cl. 361—386 5 Claims




1. A device for avoiding local overhating comprising:

an intrinsically safe measuring transducer;

a sealing composition in which said transducer is embedded;

a current limiting resistor connected to said transducer; and

a single body made of a good heat conducting material spaced from but within the direct vicinity of the current limiting resistor and entirely embedded within said sealing composition so as to distribute heat more uniformly over the entire surface of said sealing composition than when said body is not present, said single body being the only good heat conducting material of said device so that heat is not dissipated at said surface of said sealing composition by other good heat conducting materials.

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4,713,730

## MICROWAVE PLUG-IN SIGNAL AMPLIFYING MODULE SOLDERMENT APPARATUS

Ben R. Hallford, Wylie, and Robert W. McKenzie, Lewisville, both of Tex., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 7, 1985, Ser. No. 785,302

Int. Cl.[4] H05K 7/02

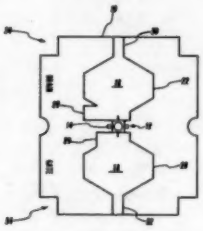
U.S. Cl. 361—419 4 Claims

1. The method of attaching a field effect transistor (FET) to one side of a substrate means having a ground plane on the opposite side where the gate and drain leads of the FET are

electrically connected to the attachment side and the source lead of the FET must be electrically connected to the ground plane on said opposite side of said substrate means comprising, the steps of:

creating two parallel positioned slots through a substrate from a ground plane side of the substrate to the side opposite wherein a FET is to be attached;

inserting the legs of a U-shaped piece of strap metal through said slots in said substrate wherein the bit portion of the U-shaped piece of strap metal is juxtaposed the ground plane and the legs of the U-shaped piece of strap metal extend through said two parallel positioned slots of the



substrate with a portion of the legs extending beyond the surface of the substrate means;

bending the legs of the U-shaped piece of strap metal whereby the portion of the legs extending beyond the surface of the substrate means is substantially parallel to the surface of the substrate means;

electrically connecting the bit portion of said U-shaped piece of strap metal to the ground plane of said substrate means;

electrically connecting the source leads of a FET to the bent legs of said U-shaped piece of strap metal; and

electrically connecting the gate and drain leads of the FET to corresponding gate and drain signal transmission means.

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**4,713,731**

**DOUBLE LAYER CAPACITOR**

**Donald L. Boos, Garfield Heights, and Allan V. Marse, Independence, both of Ohio, assignors to Standard Oil Company, Cleveland, Ohio**

**Continuation of Ser. No. 665,256, Oct. 26, 1984, abandoned, which is a continuation-in-part of Ser. No. 374,139, May 3, 1982, abandoned. This application Sep. 15, 1986, Ser. No. 907,543**

**Int. Cl.[4] H01G *9/04***

**U.S. Cl. 361—433** **15 Claims**

1. An improved double layer capacitor cell comprising:

(a) a positive and a negative electrode both comprised of carbon in admixture with a liquid electrolyte having a voltage regulating ion selected from the group of bromide, chloride, fluoride and iodide in solution therein, the voltage regulating agent having a concentration ranging from about 0.01 to about 10 moles per liter of electrolyte;

(b) a porous ionically conductive separator between said positive electrode and said negative electrode; and

(c) a first and a second ion insulating connector impervious to the electrolyte wherein the first connector is electronically connected to said positive electrode and the second connector is electronically connected to said negative electrode.

**4,713,732**

**VEHICLE WARNING SYSTEM**

**Charles Schamblin, 1714 S. "M" St., Bakersfield, Calif. 93304**

**Filed Jun. 5, 1986, Ser. No. 870,941**

**Int. Cl.[4] B60Q *1/00***

**U.S. Cl. 362—61** **10 Claims**

1. An improved vehicle light warning system, said system comprising, in combination:

(a) a flexible, resilient sheet;

(b) a plurality of light reflective means secured to the surface of said sheet and movable therewith,

(c) said sheet having an opening therein,

(d) a portable, electrically powered light source disposed within said opening and secured to said sheet,

(e) said light source having a portion thereof extending above the surface of said sheet, whereby light from said light source falls upon and is reflected from said light reflective means; and

f support means supporting said sheet and light source whereby light from said light source is reflected by said reflector means as said sheet moves in response to wind or vehicular vibration.

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**4,713,733**

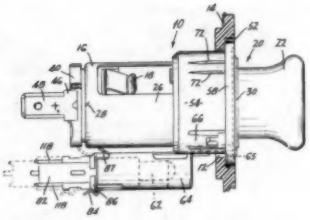
**CIGAR LIGHTER INCORPORATING GLOW RING**

**Edward J. Fitz, Fairfield, and Dominic Pesapane, West Haven, both of Conn., assignors to Casco Products Corporation, Bridgeport, Conn.**

**Filed Mar. 25, 1987, Ser. No. 30,156**

**Int. Cl.[4] F21V *33/00***

**U.S. Cl. 362—80** **31 Claims**



1. A cigar lighter assemblage for mounting on a panel through an opening of the panel from the front thereof, comprising in combination:

(a) a tubular socket having an opening for receiving an igniting unit,

(b) a light-conducting bushing surrounding said socket and constituting a bezel around the same,

(c) a lamp holder,

(d) cooperable means on said bushing and lamp holder for slidably mounting the lamp holder on the bushing between an extended position and a retracted position thereon, and

(e) means on said lamp holder, engageable with the panel to

shift the holder from its extended position to its retracted position as the bushing and holder are being frontally inserted in the opening of the panel.

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**4,713,734**
**WALL LAMPS**
**Thomas J. DeKay, 355 NE. Elm Ter., Pinecrest Lakes, Jensen Beach, Fla. 34957**
**Filed Nov. 24, 1986, Ser. No. 934,500**
**Int. Cl.[4] F21S *1/02***
**U.S. Cl. 362—147** **20 Claims**

1. A wall lamp assembly which mounts an electric light on a planar vertical surface without exposed electric wiring, comprising:

(a) elongate conduit means having a front surface and a rear surface for carrying and concealing from view electric wires for supplying electric power to said electric light;

(b) electric light support means connected to the upper end of said conduit means, including at least one electric light socket means electrically connected to said wires for supplying electric power to said electric light;

(c) electric plug means connected to, and supported by, the lower end of said conduit means, said plug means electrically connected to said wires and adapted for plugging into an electric outlet;

(d) wall attaching means connected to said conduit means for attaching said assembly to said vertical surface; said plug means including prongs extending beyond said rear surface of said conduit means for electrically engaging a wall-mounted electric outlet when said conduit means is attached to said planar vertical surface.

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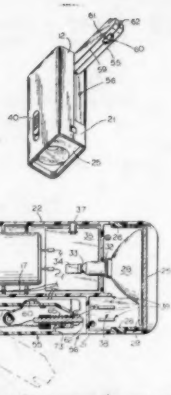
**4,713,735**
**FLASHLIGHT FOR USE IN VEHICLES**
**Paul D. Hiltman, 2543 Melinda Dr., Atlanta, Ga. 30345**
**Filed Oct. 20, 1986, Ser. No. 920,430**
**Int. Cl.[4] F21L *7/00***
**U.S. Cl. 362—183** **7 Claims**

1. A flashlight for use in vehicles which have a cylindrical socket mounted on a dashboard that is coupled with a source of electric power, and with the flashlight comprising a housing formed with an elongated recess, a battery mounted within said housing, a lamp mounted within said housing and electrically coupled with said battery through switch means, and an elongated plug electrically coupled with said battery and mounted for pivotal movement between a stowed position substantially within said housing recess and operative positions protruding out of said recess for insertion into the socket for recharging of said battery and for the mounted projection of a light beam by said lamp at variously selected directions from



the dashboard that are dependent upon the rotary position of said plug within the socket.

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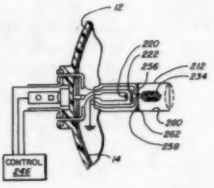
**4,713,736**
**MULTIPLE COLOR LAMP**
**George C. Kasboske, Chicago, Ill., assignor to Quintech Corporation, Chicago, Ill.**
**Continuation-in-part of Ser. No. 791,417, Oct. 25, 1985, Pat. No. 4,644,452. This application Jan. 30, 1987, Ser. No. 9,238**
**Int. Cl.[4] F21M *3/14***
**U.S. Cl. 362—214** **17 Claims**




1. In a lamp having a first bulb with a first light source and a first light transmitting surface for causing light transmitted therethrough by the first light source to have a first color, the improved comprising:

a second bulb contained substantially within said first bulb, said second bulb having a second light transmitting surface for causing light transmitted therethrough to have a second color;

a second source for transmitting light through said second light transmitting surface; and

means for at least partially shielding said second light transmitting surface from light from said first light source.

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**4,713,737**
**ELECTRICAL LIGHTING FIXTURE WITH MULTIPLE ROTATION MECHANISM**
**Martin L. Lasker, Edison, N.J., and Joel S. Cohen, Oakland, Calif., assignors to Prescolite Inc., San Leandro, Calif.**
**Filed Apr. 7, 1986, Ser. No. 848,634**
**Int. Cl.[4] F21V *21/28***
**U.S. Cl. 362—285** **11 Claims**

1. A lighting fixture mechanically connected to an object and electrically connected to a source of electrical power comprising:

a. a lamp supporting body having an exterior and an interior thereto;

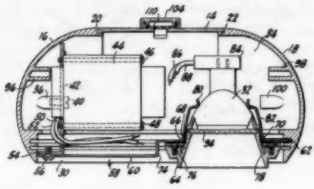
b. means for rotating said lamp supporting body about a first axis, said rotating means comprising;

a swivel member including a swivel arm which moves over said exterior of said lamp supporting body;

a boss extending upwardly from said swivel arm, said boss being mechanically connected to the object;

means for supporting said boss for movement with said swivel arm over said exterior of said lamp supporting body;

c. means for supporting the lamp to the lamp supporting body, said lamp being connected to the sorce of electrical power;



d. means for rotating said boss relative to said lamp supporting body held thereto about a second axis, greater than three hundred sixty degrees of arc about said second axis, including:

said boss having a portion including a stop;

a rotatable washer having a first stop which is capable of contacting said stop of said boss and having second and third stops; and

a clamp which contacts said lamp supporting body, said clamp including first and second stops which contact said second and third stops of said washer, said clamp holding said swivel member and supported boss to said lamp supporting body.

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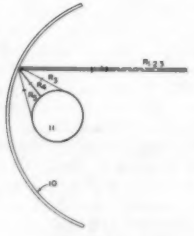
**4,713,738**

## LIGHT FIXTURE USING A HOLOGRAPHIC OPTICAL REFLECTOR

**Charles S. Davis, 51 Wooster St., New York, N.Y. 10012**

**Filed Aug. 15, 1986, Ser. No. 897,294**
**Int. Cl.[4] F21V 7/00**
**U.S. Cl. 362—296** **4 Claims**



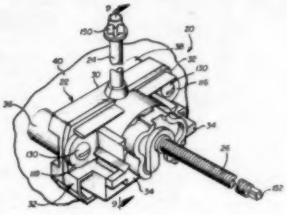
1. An architectural lighting fixture comprising a reflective holographic optical element and means for fixing an incoherent light source in a spatial relationship to the reflective holographic optical element such that radiation from the light source impinges on the reflective holographic optical element and is directed by the reflective holographic optical element to a task area.

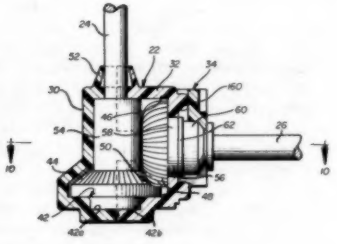
**4,713,739**

## CLAM SHELL GEAR BOX HOUSING AND RETAINER

**Francis E. Ryder, and Stephen P. Lisak, both of Arab, Ala., assignors to Ryder International Corporation, Arab, Ala. and Textron, Inc., Providence, R.I., a part interest**

**Filed Jan. 6, 1987, Ser. No. 875**
**Int. Cl.[4] B60Q 1/08**
**U.S. Cl. 362—424** **21 Claims**



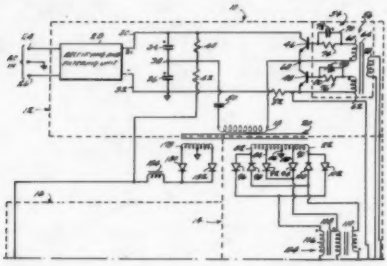


1. An adjusting mechanism for a headlamp or the like, comprising: a two-piece molded housing member having a first housing piece and a second housing piece defining first and second orthogonally disposed gear-receiving bores when the first and second housing pieces are in assembled condition, with said bores generally intersecting at a peripheral location with respect to each other so as to receive respectively a drive gear member disposed in said first gear-receiving bore and an adjusting gear member disposed in said second gear-receiving bore, with the gear members being engageable at the locations where the first and second gear-receiving bores intersect; drive shaft-receiving means defined in said housing pieces for receiving and guiding a drive shaft for engagement with a drive gear received in said first gear-receiving bore and extending outwardly from the housing; adjusting shaft-receiving means defined in said second housing piece for receiving an adjusting shaft for engagement with an adjusting gear received within said second gear receiving bore and extending from said housing for engagement with a headlamp or the like, such that by rotation of the drive gear member, rotational movement will be imparted to the adjusting shaft in response to rotation of the first and second gear members when engaged, said rotational movement being usable to effect adjustment of a headlamp assembly or the like; wherein said first housing piece includes gear retainer wall means extending in the direction of said second gear-receiving bore for holding an adjusting gear member in place within said second gear-receiving bore and wherein said first and second housing pieces include cooperating interlocking tab means and slot means located closely adjacent the periphery of said first gear-receiving bore so as to maintain the housing pieces in an assembled condition and to resist spreading apart thereof in response to loading of the respective gears carried within said gear-receiving bores.

## 4,713,740
## SWITCH-MODE POWER SUPPLY

**Richard B. Drabing, Los Altos, Calif., assignor to SMS Advanced Power, Inc., Cupertino, Calif.**

**Filed Jul. 27, 1984, Ser. No. 634,882**
**Int. Cl.[4] H02M** *3/335*
**U.S. Cl. 363—17** **12 Claims**



1. An apparatus for producing a regulated voltage, said apparatus comprising:

means for producing an unregulated voltage level;

active regulating means, connected to receive said unregulated voltage level, for producing a regulated voltage level at an output terminal thereof, said regulating means including a power input terminal for receiving power to operate said active regulating means;

means, connected to said unregulated voltage level, for drawing current from said unregulated voltage level producing means;

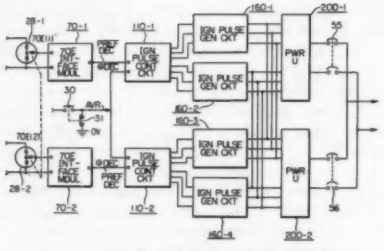
current storing means, connected to both said current drawing means and to the output terminal of said regulating means, for storing said current drawn from said unregulated voltage level producing means and for also storing current produced by said regulating means; and

switching means for applying the current stored in said current storing means to the power input terminal of said regulating means when the amount of charge stored by said current storing means exceeds a predetermined level.

## 4,713,741
## EXCITATION CONTROL APPARATUS FOR ROTARY ELECTRIC MACHINE

**Tutomu Yamada, Kobe, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Jul. 8, 1986, Ser. No. 883,508**
**Claims priority, application Japan, Jul. 9, 1985, 60-151892**
**Int. Cl.[4] H02H** *7/00;* **H02P** *9/00*
**U.S. Cl. 363—50** **2 Claims**



1. An excitation apparatus for controlling excitation current to a field coil of a rotary electric machine to produce a constant output from the rotary electric machine, said apparatus comprising an AVR circuit producing an AVR signal,

two manual voltage setting units including two inductive voltage regulators providing outputs equal to each other,

two interface module circuits including circuit means inverting the outputs of said manual voltage setting units into DC voltages and producing rectified, filtered outputs representing a manual set value for the output voltage of the generator,

two ignition pulse control circuits, each circuit connected to receive the manual set value representing output of each interface module and further connected to receive AVR signals and including means comparing the AVR signal and the set value representing output and producing a field current decrease preferring signal responsive to the comparison therebetween,

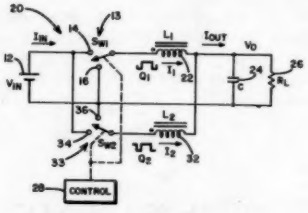
a plurality of sets of ignition pulse generator circuits connected to receive outputs from said ignition pulse control circuits and generate ignition pulses of six phases respectively, and

a plurality of power units connected to provide field excitation power to the rotary electric machine including thyristors, the ignition pulses from said ignition pulse generator circuits being connected to gates of said thyristors in parallel, whereby said field excitation power units prefer increase of the field current.

## 4,713,742
## DUAL-INDUCTOR BUCK SWITCHING CONVERTER

**David W. Parsley, Draper, Utah, assignor to Sperry Corporation, Blue Bell, Pa.**

**Filed Oct. 9, 1986, Ser. No. 917,126**
**Int. Cl.[4] H02M** *3/10*
**U.S. Cl. 363—124** **1 Claim**




1. A DC-to-DC power converer for regulating the voltage supplied from a DC input power sourced from first and second input terminals to an output load having first and second output terminals,

regulating means comprising first and second switch means each constructed to switch between said first input terminal and said second input terminal so as to alternately complete and open first and second conduction paths to said first output terminal when so switched, and first and second inductive means each coupled in series in one of said conduction paths with one of said first and second switch means and to said first output terminal, each of said inductive means and its associated series-connected switch means being connected in parallel with the other of said inductive means and its associated series-connected switch means, and being wound with the same polarity sense, and

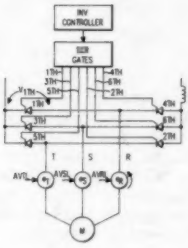
control means coupled to said first and second switch means so that both the said switch means are on more than 50% of the time, and also so that after one of said switch means is switched off from said first input terminal the other of said switch means will be switched onto said first input terminal wherein current that flows in said first inductive means increases after said first switch means is switched to said first terminal and the current that flows in said second inductive means decreases after said second switch means is switched to said first terminal.

## 4,713,743

## LOAD-COMMUTATED INVERTER AND SYNCHRONOUS MOTOR DRIVE EMBODYING THE SAME

**Alberto Abbondanti, Penn Hills Township, Allegheny County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Feb. 6, 1987, Ser. No. 11,969**
**Int. Cl.[4] H02M 7/521**
**U.S. Cl. 363—138** **13 Claims**




1. In a load commutated inverter system including a plurality of static power switches of the inverter controlled for supplying on respective phases, to a load and via load terminals, AC voltages and currents with a leading power factor, said power switches being controlled in a firing sequence in accordance with a predetermined phase order, the combination of:

means for controlling for conduction an incoming switch in said sequence during an overlap time interval allowing an outgoing switch in said sequence to be oppositely biased under the line-to-line voltage existing between the phase terminals of said incoming and outgoing switches; and

means responsive to said controlling means for applying to said outgoing switch an additional bias voltage during another time interval adjoining and extending beyond said overlap time interval, thereby to establish a time recovery period for said outgoing switch which is coextensive with said another time interval.

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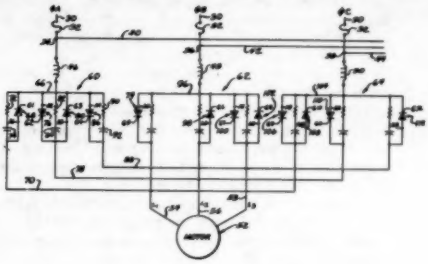
## 4,713,744

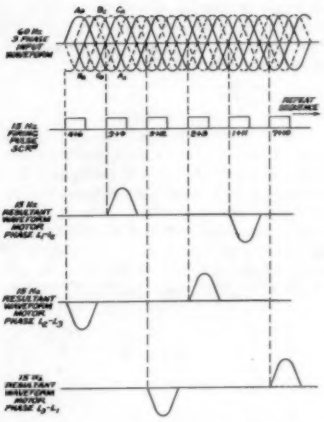
## FRACTIONAL FREQUENCY CONVERTER USING ZERO SWITCHING OF INPUT FREQUENCY HALFWAVES

**David B. Coston, Crossville, Ill., assignor to Torcon Products, Inc., Highland Park, Ill.**

**Filed Oct. 28, 1986, Ser. No. 924,049**
**Int. Cl.[4] H02M 5/27**
**U.S. Cl. 363—160** **19 Claims**

1. A frequency converter is for a multi-phase electric motor comprising input means for connection to a multi-phase alternating current electric supply source, an output means for connection to a multi-phase utilization means such as a multi-phase electric motor, an SCR bridge comprising a plurality of SCRs interconnecting said input means and said output means, trigger circuit means connected to said SCR bridge for effecting selective firing of said plurality of SCRs, means connected to said input means for developing a plurality of timing pulses upon zero crossing of the input means phases, and logic circuit means interconnecting said timing pulse means and said trigger circuit means for effecting selective sequential firing of said plurality of SCRs at said zero crossings, firing of said SCRs





being respectively terminated upon reversal of a respective phase.

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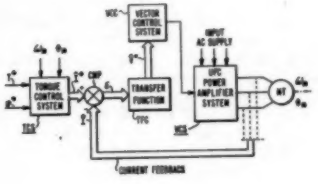
## 4,713,745

## VECTOR-CONTROLLED UNRESTRICTED FREQUENCY CHANGER (UFC) SYSTEM AND VARIABLE SPEED AC MOTOR DRIVE USING SUCH A SYSTEM

**Colin D. Schauder, Murrysville Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jul. 22, 1986, Ser. No. 888,911**
**Int. Cl.[4] H02M 5/257**
**U.S. Cl. 363—161** **9 Claims**




1. In a UFC system including a plurality of static bilateral switches controlled for conduction to successively interconnect selected pairs of the input terminals of a three-phase AC voltage source with corresponding pairs of output terminals belonging to a three-phase load;

said selected pairs being selected in accordance with a predetermined sequential order in each load phase and for a

predetermined succession of said load phases; the combination of:

means responsive to said AC voltage source for deriving a signal representative of actual electrical degree run by said AC voltage source in a cyclic succession from a zero angle reference;

means for providing a signal representative of an output voltage vector demand angle for said AC load;

comparator means responsive to said actual electrical degree representative signal and to said vector demand angle representative signal for providing an address signal representative of the phase shift between said vector demand angle and said electrical degree;

ROM means for storing electrical angle values related to said zero angle reference as addressed values, and for storing in relation thereto predetermined switch combinations commands;

said ROM means being responsive to said comparator means for selecting a combination command in accordance with said address signal; and

means responsive to said ROM means for establishing with said switches a switch combination for conduction in accordance with said address signal and the corresponding switch combination command.

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**4,713,746**

## METHOD FOR FORMING PICTURES

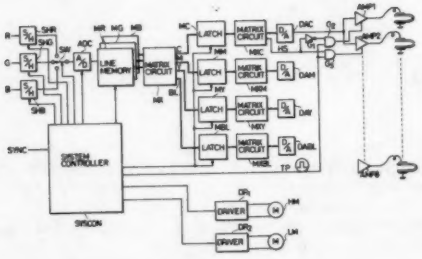
**Yoshitaka Watanabe, Tokyo; Nobuaki Sakurada, Yokohama; Hideaki Kawamura, Tokyo, and Yuichi Sato, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 801,504, Nov. 25, 1985, abandoned, which is a continuation of Ser. No. 491,654, May 5, 1983, abandoned. This application Dec. 23, 1986, Ser. No. 946,095**

**Claims priority, application Japan, May 14, 1982, 57-81771; May 19, 1982, 57-84170; Jul. 17, 1982, 57-124768**

**Int. Cl.[4] G01D *15/16*; H04N *1/23***

**U.S. Cl. 346—1.1** **6 Claims**




1. A method of forming on a medium a picture comprising a plurality of picture elements with different light-reflecting properties that provide different optical reflection densities by usng picture forming elementary particles to form the picture elements, the method comprising the steps of:

providing on the medium a first type of elementary particle having a first concentration to form picture elements the optical reflection densities of which are higher than a perdetermined level and having a size varied in accordance with the optical reflection density of the picture element to be formed, substantially all of said first type of elementary particles having a size of a least about 80 microns;

providing on the medium a second type of elementary particle having a second concentration lower than said first concentration to form picture elements the optical reflection densities of which are lower than the predetermined level and having a size varied in accordance with the optical reflection density of the picture element to be formed; and

determining said predetermined optical reflection density level so that, if the range of the optical reflection densities of the particles is defined by representing a minimum optical reflection density as 0 and a maximum optical reflection density as 1.0, optical reflection densities at least below about 0.3 are provided by the second type of particle.

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**4,713,747**

## NUMERICALLY CONTROLLED MACHINING METHOD USING PRIMARY AND COMPENSATING CUTTERS

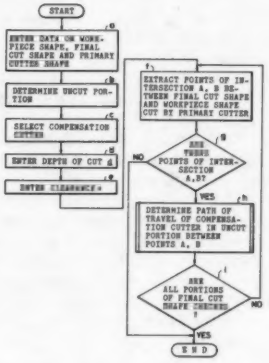
**Tomomitsu Niwa, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 532,133, Sep. 14, 1983, abandoned. This application May 14, 1986, Ser. No. 864,752**

**Claims priority, application Japan, Sep. 14, 1982, 57-159872**

**Int. Cl.[4] G05B *19/18***

**U.S. Cl. 364—170** **13 Claims**


START
ENTER DATA ON WORKPIECE SHAPE, FINAL CUT SHAPE AND PRIMARY CUTTER SHAPE
DETERMINE UNCUT PORTION
SELECT COMPENSATION CUTTER
ENTER DEPTH OF CUT d
EXTRACT POINTS OF INTERSECTION A, B BETWEEN FINAL CUT SHAPE AND WORKPIECE SHAPE CUT BY PRIMARY CUTTER
ARE THERE POINTS OF INTERSECTION A,B?
NO
YES
DETERMINE PATH OF TRAVEL OF COMPENSATION CUTTER IN UNCUT PORTION BETWEEN POINTS A, B
ARE ALL PORTIONS OF FINAL CUT SHAPE CHECKED ?
NO
YES
END

1. An NC machining method for machining a workpiece with a primary cutter in a primary machining mode and then machining workpiece portions left uncut by the primary cutter with a compensation cutter in a compensation machining mode to thereby produce a desired final cut shape, said NC machining method comprising the steps of:

entering data on the original shape of the workpiece, the desired final cut shape, and the shape of the primary cutter into an NC apparatus;

automatically determining the uncut workpiece portions based on said entered data, said uncut workpiece portions comprising those portions of said workpiece which must be cut to achieve said final cut shape, but which cannot be reached using said primary cutter;

automatically selecting a compensation cutter suitable for cutting off said uncut workpiece portions in the compensation machining mode;

setting data on the depth of cut and selecting the clearance of the compensation cutter, said clearance being selected by setting a distance between the compensation cutter and workpiece so as to prevent the compensation cutter from contacting the workpiece;

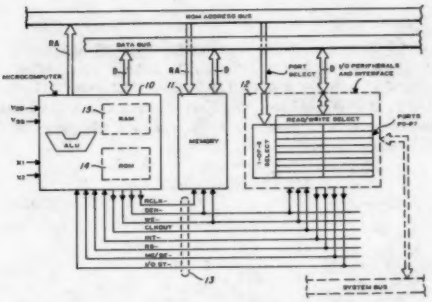
determining paths of travel of said compensation cutter from the uncut workpiece portions, the depth of cut of said compensation cutter, and said clearance of said compensation cutter; and

cutting off said uncut workpiece portions by moving said compensation cutter along the determined paths of travel.

## 4,713,748
## MICROPROCESSOR WITH BLOCK MOVE INSTRUCTION

Surendar S. Magar; Daniel L. Essig; Richard D. Simpson, all of Houston, and Edward R. Caudel, Stafford, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 12, 1985, Ser. No. 701,827
Int. Cl.[4] G06F *13/00*
U.S. Cl. 364—200 8 Claims




1. A microcomputer system comprising:

(A) a microcomputer device formed in a single integrated circuit and having data input/output terminals and address terminals;

(B) memory means external to the microcomputer device having address input terminals and data output means;

(C) input/output peripheral means for transfer of information to or from external equipment, said peripheral means having address input means and data input/output means;

(D) external address bus means coupled to the address output terminals of the microcomputer device, and coupled to the address input means of said peripheral means and to the address input terminals of said memory means;

(E) external data bus means coupled to said data input/output terminals of the microcomputer device, and coupled to the data input/output means of said peripheral means and the data output means of the memory means;

(F) the microcomputer device comprising within said integrated circuit:

an arithmetic/logic unit having data input and data output;

a first read/write memory having an address input and having data input/output means;

internal data bus means coupled to the data input and data output of the arithmetic/logic unit and coupled to the data output of the arithmetic/logic unit and coupled to the data input/output means of the first read/write memory;

a second read/write memory having an address input and having data input/output means, the second read/write memory storing data or instruction words;

data memory address means connected to said address input of said first and second read/write memories for storing destination addresses specified by an instruction word

program address means connected to the address input of the second read/write memory;

internal program bus means coupled to said data input-/output means of said second read/write memory, to said data input/output terminals, and coupled to said program address means;

control means having an input coupled to said program bus means and generating microcontrol signals in response to instruction words, the microcontrol signals defining operation of the arithmetic/logic unit and controlling the transfers to and from the internal bus means;

said control means including means for executing a first block-move instruction for copying a series of sequential memory address contents from the external memory means to the first read/write memory, and a second block-move instruction for copying a series of sequential memory address contents from the external memory means to the second read/write memory,

where in each of said first and second block move instructions the addresses for said series are generated from said program address means, and the destination addresses in said first or second read/write memory are generated in said data memory address means when executing an instruction before the first block-move instruction.

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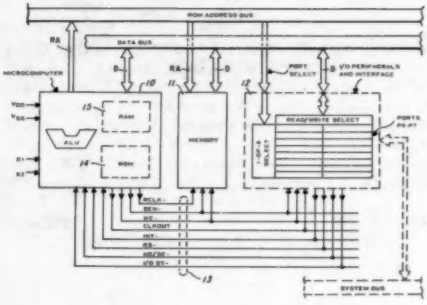
## 4,713,749
## MICROPROCESSOR WITH REPEAT INSTRUCTION

Surendar S. Magar, and Daniel L. Essig, both of Houston, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 12, 1985, Ser. No. 701,829
Int. Cl.[4] G06F *13/00*
U.S. Cl. 364—200 5 Claims




1. A microcomputer system comprising:

(A) a microcomputer device formed in a single integrated circuit and having data input/output terminals and address output terminals;

(B) memory means external to the microcomputer device having address input means and data output means;

(C) external address bus means coupled to the address output terminals of the microcomputer device, and coupled to the address input means of said memory means;

(D) external data bus means coupled to said data input/output terminals of the microcomputer device, and coupled to the data means and output means of the memory means;

(E) the microcomputer device comprising within said integrated circuit:

an arithmetic/logic unit having data input and data output;

read/write memory means having an address input and having data input/output means;

a plurality of data address means connected to said address input of said read/write memory means for storing destination addresses specified by an instruction word,

internal data bus means coupled to the data input and data output of the arithmetic/logic unit and coupled to said data address means and to said data input/output means of said read/write memory means;

program address means connected to said address input of said read/write memory means;

internal program bus means coupled to said data input-/output means of said read/write memory means, to

said data input/output terminals, and coupled to said program address means;

control means having an input coupled to said program bus means to receive instruction words, said control means having outputs coupled to said arithmetic/logic unit, coupled to said internal data bus and program bus means, coupled to said program address means, and coupled to said data address means; said control means generating microcontrol signals on said outputs of the control means in response to said instruction words, the microcontrol signals defining operation of the arithmetic/logic unit and controlling the transfers to and from the internal data bus means and the internal program bus means; said instruction words being selected from an instruction set, said control means including means for storing a repeat count;

said control means including means for executing a "repeat" instruction followed by an instruction word selected from said instruction set, to cause said selected instruction word following said "repeat" instruction to be executed a number of times defined by a number contained in said "repeat" instruction and stored by said means for storing a repeat count; said selected instruction word storing data from said external memory means in said read/write memory means at said destination addresses contained in said data address means.

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**4,713,750**

## MICROPROCESSOR WITH COMPACT MAPPED PROGRAMMABLE LOGIC ARRAY

**Nabil G. Damouny, Sunnyvale; Min-Siu Huang, Mountain View; Dan Wilnai, Sunnyvale, and Yeshayahu Mor, Cupertino, all of Calif., assignors to Fairchild Camera & Instrument Corporation, Mountain View, Calif.**

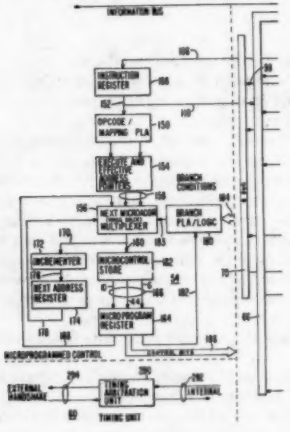
**Continuation-in-part of Ser. No. 481,061, Mar. 31, 1983, Pat. No. 4,573,118. This application Oct. 30, 1984, Ser. No. 666,215**

**Int. Cl.[4] G06F *9/22***

**U.S. Cl. 364—200** **6 Claims**

**MICROFICHE APPENDIX INCLUDED**

**(8 Microfiche, 433 Pages)**



1. In a microprocessor having an ALU and an information bus:

a single programmable logic array containing a plurality of microcode addresses for different types of operations;

an instruction register connected to provide inputs to said programmable logic array;

a multiplexer connected to provide inputs to said instruction register, said multiplexer receiving inputs from an external console connected to said information bus and from said ALU.

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**4,713,751**

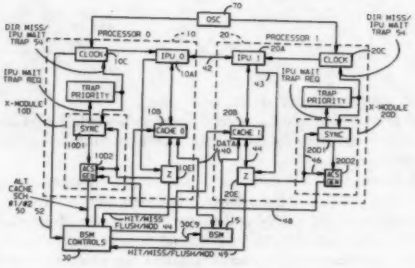
## MASKING COMMANDS FOR A SECOND PROCESSOR WHEN A FIRST PROCESSOR REQUIRES A FLUSHING OPERATION IN A MULTIPROCESSOR SYSTEM

**Patrick F. Dutton, Endicott, and Earl W. Jackson, Jr., Apalachin, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 24, 1984, Ser. No. 664,283**

**Int. Cl.[4] G06F *13/32***

**U.S. Cl. 364—200** **5 Claims**



1. A multiprocessor system comprising:

a memory;

a first processor connected to said memory, said first processor storing data therein;

a first command status register connected to said first processor, said first command status register for storing normal command information for the execution of instructions by said first processor and flushing command information for the execution of instructions by a second processor;

said second processor connected to said memory and to said first processor, said seocnd processor requiring access to said data in said first processor to execute an instruction, said second processor causing said first processor to store flushing command information in said first command status register upon the detection of said data in said first processor;

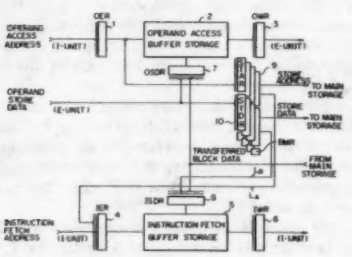
a second command status register connected to said second processor, said second command status register storing normal command information for the execution of instructions by said seocnd processor;

a memory control circuit connected to said memory, said first and said second processor, and said first and said second command status registers, said memory control circuit transferring data between said memory and said first processor in response to said normal command information in said first command status register during the execution of instructions by said first processor, and flushing said data in said first processor to said memory and masking normal command information in said second command status register in response to said flushing command information in said first command status register during the execution of instructions by said second processor.

## 4,713,752
## BUFFER STORAGE SYSTEM

**Hirosada Tone, Fuchu, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Filed Dec. 5, 1984, Ser. No. 678,684**
**Claims priority, application Japan, Dec. 7, 1983, 58-231104**
**Int. Cl.⁴ G06F *9/36***
**U.S. Cl. 364—200** **14 Claims**




1. A buffer storage system operatively connected with an instruction unit, an execution unit, and a main storage to set up a pipeline processor, comprising:

operand access buffer storage means for storing operand data accessed by an operand store address or an operand fetch address from said instruction unit and transferring the accessed operand date therefrom to said execution unit;

instruction fetch buffer storage means for storing instruction data accessed by an instruction fetch address from said instruction unit and transferring the accessed instruction data to said instruction unit;

feedback register means, operatively connected to said operand access buffer storage means, for temporarily storing the operand store address and the operand data and comprising store address register and store data registers, activated during an operand store operation, wherein said operand store address and corresponding operand data, respectively, sent from said execution unit are buffered and then transfered to said main storage by said information register means to provide a store-through method; and

feedback means, operatively connected between said feedback register means and said instruction fetch storage means, for applying the buffered operand store address and operand data, temporarily stored in said store address registers and said store data registers, respectively, to said instruction fetch buffer storage.

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## 4,713,753
## SECURE DATA PROCESSING SYSTEM ARCHITECTURE WITH FORMAT CONTROL

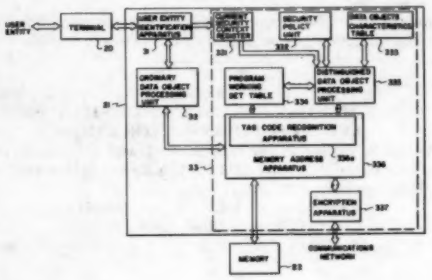
**William E. Boebert, and Richard Y. Kain, both of Minneapolis, Minn., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Feb. 21, 1985, Ser. No. 703,638**
**Int. Cl.⁴ G06F *1/00*; H04L *9/00***
**U.S. Cl. 364—200** **17 Claims**

1. A data processing system having protected system files, wherein each protected system file is associated with a data format and wherein said data processing system operates in response to programs or groups of programs which perform specific tasks, comprising: identification means for identifying a user interacting

with said data processing system, said identification means relating preselected security attributes with said user; and

secure processor, connected to said identification means, for storing, at least temporarily, a security policy and for processing data in accordance with said security policy, said security policy defining permissible access rights to said protected system files in terms of possible values of data formats, possible values of said preselected security attributes and functions of said specific tasks, wherein data stored in said secure processor can be altered only by a director entity of said data processing system and retrieved only by portions of said secure processor, said secure processor having generating means for generating an access rights signal for any one of said protected system




files, said access rights signal being determined by a comparison of said security policy to said predetermined security attributes, said data format associated with said any one of said protected system files and any functions to be performed with or upon said any one of said protected system files.

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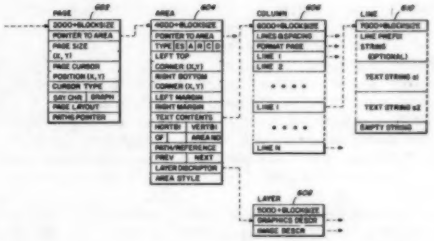
## 4,713,754
## DATA STRUCTURE FOR A DOCUMENT PROCESSING SYSTEM

**Arun K. Agarwal, Chelmsford; Suzanne C. Knapp, Lowell, and David R. Lakness, Chelmsford, all of Mass., assignors to Wang Laboratories, Inc., Lowell, Mass.**

**Filed Oct. 9, 1984, Ser. No. 658,952**
**Int. Cl.⁴ G06F *15/40, 7, 00, 12/00***
**U.S. Cl. 364—200** **12 Claims**




1. In a document processing system including a memory means operable for storing therein data representative of information appearing in a document and a CPU means coupled to the memory means for storing and retrieving the document data therein, the CPU means further being operable for storing within the memory means and for processing therein data representative of information appearing in the document, a method of storing within and retrieving from the memory means data representing information appearing in a document, comprising the steps of:

for each document, storing within the memory means data representing a page block for defining at least one page,

for each page, storing within the memory means data representing an area block for subdividing the page into one or more contiguous and nonoverlapping areas, wherein each area contains at least one type of information,

in an area containing text information,

storing within the memory means data representing a column block for defining at least one column for containing text information,

for each column, storing within the memory means data representing a line block for defining at least one line, and for each line, storing a string of at least one text character,

storing within the memory means data representing information for defining attributes applying to the characters of the string, and

storing within the memory means data representing information for defining external data items associated with the line.

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**4,713,755**

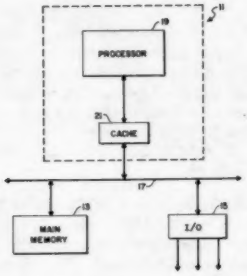
## CACHE MEMORY CONSISTENCY CONTROL WITH EXPLICIT SOFTWARE INSTRUCTIONS

**William S. Worley, Jr.; William R. Bryg, both of Saratoga, and Allen Baum, Palo Alto, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Jun. 28, 1985, Ser. No. 750,381**

**Int. Cl.[4] G06F *12/08***

**U.S. Cl. 364—200** **5 Claims**




1. A computer system having a multi-level memory hierarchy and means for maintaining the integrity of blocks of information stored at different levels in the hierarchy, comprising:

a processor for executing instructions and processing data, said processor executing a set of instructions for providing explicit control of the transfer of blocks of data between levels of the memory hierarchy;

memory for storing instructions and data;

an I/O channel connected to the memory for transferring data and instructions into and out of the memory;

a cache connected between the processor and the memory for storing selected blocks of information from the memory for use by the processor, and having associated with each stored block a valid status flag and a dirty status flag; and

an operating system resident in memory and accessible by the processor, containing the instructions in the instruction set, for causing the execution of certain of the instructions from the instruction set to ensure the consistency of the information stored in the cache with the information transferred into and out of memory.

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**4,713,756**

## NON-VOLATILE MEMORY DEVICE FOR A PROGRAMMABLE CONTROLLER

**Ralph E. Mackiewicz, Madison Heights, and Michael A. Kuhn, Royal Oak, both of Mich., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Feb. 28, 1985, Ser. No. 706,571**

**Int. Cl.[4] G06F *1/00, 13/00***

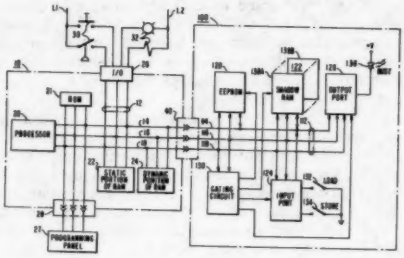
**U.S. Cl. 364—200** **14 Claims**

1. In a programmable controller including a data bus having data, address and control lines and having connected thereto a processor, input device means in communication with the processor via the data bus and external input devices for transmitting information from external input devices to the processor, output device means in communication with the processor via the data bus and external output devices for transmitting information from the processor to the external output devices, volatile memory means for containing static information including a control program for controlling the outputs dependent on the status of the inputs and dynamic information including the status of timers and counters, and an external interface, a nonvolatile memory device for retaining the static and dynamic information contained in the volatile memory when the programmable controller is deenergized, comprising:

a memory device data bus having data, address, and control lines;

interface connection means in connection with the memory device data bus for removably attaching the memory device to the external interface of the programmable controller thereby connecting the memory data bus to the programmable controller data bus when the memory device is so attached;

controllable nonvolatile random access memory (RAM) means connected to the memory device data bus for storing information received via the memory device data bus, the nonvolatile RAM means retaining the information contained therein during the periods of time when the programmable controller is deenergized;




controllable input port means connected to the memory device data bus for receiving external signals including a LOAD signal for the leading of information contained in the nonvolatile RAM means into the processor and a STORE signal for the writing of information from the processor into the nonvolatile RAM means of the memory device, the LOAD signal and the STORE signal being transmitted to the processor on the occurrence thereof;

controllable output port means connected to the memory device data bus for providing a BUSY indicator when information is being transferred between the memory device and the central processor; and

gating circuit means responsive to the processor with the nonvolatile RAM means, the input port means, and the output port means being responsive to the gating circuit means, when enabled by the processor the gating circuit means:

(a) controlling the direction of information flow into and out of the nonvolatile RAM means in response to the occurrence of the STORE signal and the LOAD signal, respectively;

(b) enabling the output port means to provide the BUSY signal; and

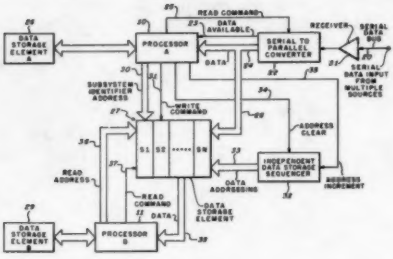
(c) disabling the input port means until the transfer of information between the memory device and the programmable controller has been completed.

4,713,757

## DATA MANAGEMENT EQUIPMENT FOR AUTOMATIC FLIGHT CONTROL SYSTEMS HAVING PLURAL DIGITAL PROCESSORS

Dale D. Davidson, and Douglas G. Endrud, both of Glendale, Ariz., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 11, 1985, Ser. No. 743,535
Int. Cl.[4] G06F *11/16*
U.S. Cl. 364—200 9 Claims




1. Data management apparatus for an automatic flight control system having at least first and second digital data processor means, said first and second processor means including respective first and second data storage means, said system including sensor means for providing data signals to said first and second processor means for storage in said respective first and second data storage means, said apparatus comprising

means for conveying said data signals from said sensor means to data bus means,

first data path means for directing said data signals from said data bus means to said first processor means for storage in said first data storage means,

independent data storage means,

second data path means for directing said data signals from said data bus means to said independent data storage means for storage therein,

independent address generator means for providing addresses to said independent data storage means at which to store said data signals, and

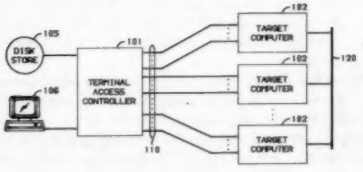
means for transfer directing said data signals stored in said independent data storage means to said second processor means for storage in said second data storage means.

4,713,758

## COMPUTER TESTING ARRANGEMENT

Nergal R. De Kelaita, Skokie; Joe T. Hall, Winfield, and Barrie D. Kletscher, Plainfield, all of Ill., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 29, 1985, Ser. No. 728,671
Int. Cl.[4] G06F *11/00*
U.S. Cl. 364—200 21 Claims




1. A computer testing arrangement comprising:

a plurality of test set ports;

a first and second memory queue;

a plurality of data storage files;

means for transferring data messages from said test set ports to said first memory queue;

means for reading and examining messages from said first queue and for storing messages read from said first queue into said second queue together with a message designation indicative of message type;

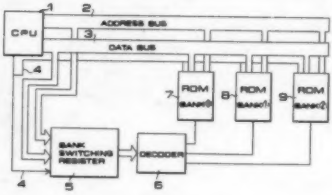
means for transferring data messages having a first predetermined message designation from said second queue to a first one of said data storage files and for transferring data messages having another predetermined message designation from said second queue to another of said data storage files.

4,713,759

## MEMORY BANK SWITCHING APPARATUS

Hideaki Yamagishi, and Tetsuro Oshimi, both of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 25, 1985, Ser. No. 695,252
Claims priority, application Japan, Jan. 27, 1984, 59-12993
Int. Cl.[4] G06F *12/06*
U.S. Cl. 364—200 3 Claims




1. A memory bank switching apparatus comprising: an address bus, a data bus and a control line; a plurality of memory banks consisting of ROMs and storing mutually different programs therein connected in parallel to said address bus, said data bus and said control line; a CPU for feeding an address signal to said address bus and a write control signal to said control line and for transmitting and receiving a data signal over said data bus; and a bank switching register connected to said CPU through said address bus, said data bus and said control signal line; said bank switching register, when addressed by said address bus, being responsive to the write control signal for storing therein a number corresponding to a selected one of said memory banks from said data bus; and said bank switching register being connected to said memory banks for enabling the selected memory bank and for disabling the non-selected memory bank or banks.

4,713,760

## TRANSACTION PROCESSING SYSTEM FOR SEPARATE REGISTRATION AND SETTLEMENT FUNCTIONS

Kazutoshi Yamada, Nagaokakyo, and Takao Yamaguchi, Joyo, both of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Jun. 11, 1985, Ser. No. 743,398
Claims priority, application Japan, Jun. 11, 1984, 59-120497
Int. Cl.[4] G06F *15/20*
U.S. Cl. 364—405 8 Claims

1. A transaction processing system comprising an electronic cash register machine and a balance settling machine,

(1) said electronic cash register machine including:

input means for entering at least the figures representing the prices for the items or services purchased by a customer and the actual amount of money temporarily paid by the customer for the purchased items or services;

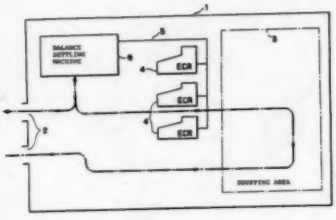
storage means for holding at least the cumulative records of the figures for the purchased items or services as entered from the input means;

arithmetic and logic means responsive when the amount of money as received is actually entered from the input means, for determining whether there is any outstanding

balance of money to be returned, by comparing the actual amount of money and the cumulative figure records stored in the storage means and for calculating those two different data to find a balance data if the actual amount of money is greater than the total amount of the cumulative figure records;

first read/write means for writing an identifier code for identifying a particular customer onto a new recording medium to be handed to the particular customer and issuing the same recording medium, or for reading an existing recording medium containing the existing identifier code previously recorded; and

data transmit means responsive when the balance calculation actually occurs within the arithmetic and logic means, for delivering to the balance settling machine the cumulative figure records stored in the storage means together with the customer's identifier code, as well as the balance data if it is determined by the arithmetic and logic means that there is the outstanding balance of money to be returned; and




(2) said balance settling machine including:

second read means responsive when the customer actually inserts either of the recording mediums, for reading the identifier code contained in the recording medium;

receive means for accepting the data sent from the data transmit means within the electronic cash register machine;

print means responsive when the second read means actually reads the identifier code from the recording medium, for printing out the data associated with the particular customer's identifier code and accepted by the receive means on print medium and issuing a receipt slip; and

change deliver means responsive when the second read means actually reads the identifier code from the recording medium, for determining whether the data accepted by the receive means contains the balance data and delivering the balance of money equivalent to the balance data if it is determined that it is contained.

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**4,713,761**

## SYSTEM FOR CENTRALIZED PROCESSING OF ACCOUNTING AND PAYMENT FUNCTIONS

**Murem S. Sharpe, Stamford; Eugene Bryson, Redding; Flavio Manduley, Woodbury; Eben M. Riordan, II, Southport, and Brian D. Flesser, Norwalk, all of Conn., assignors to Pitney Bowes, Inc., Stamford, Conn.**

**Filed Jul. 18, 1985, Ser. No. 756,420**
**Int. Cl.[4] G06F *15/24***
**U.S. Cl. 364—406** **16 Claims**

1. A system for accounting for Transaction costs comprising:

(a) input means for inputting Item Information and for producing Transaction Information in accordance with said Item Information, said input means being located at the premises of a buyer;

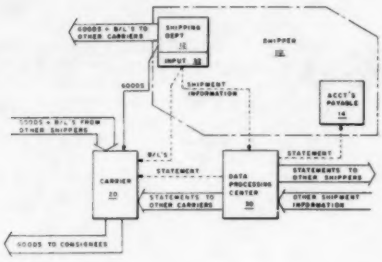
(b) data processing means responsive to said Transaction Information for:

(b1) maintaining accounts for said buyer and a group of sellers consisting of at least one seller;

(b2) determining Transaction costs and identifying a seller from said group in accordance with said Transaction Information;

(b3) debiting said account of said buyer for the amount of said Transaction costs and crediting said account of said identified seller with said amount;

(b4) generating statements of their account for said buyer and said group of sellers; and,




(b5) after debiting said buyer's account said data processing system determining if additional funds are needed to cover said Transaction costs and, if so, generating an output to said buyer advising said buyer of the need for additional funds; and,

(c) communications means for transmitting said Transaction Information from said input means to said data processing means.

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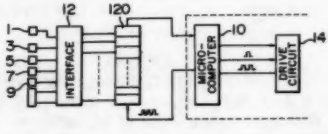
**4,713,762**

## VEHICLE-MOUNTED ELECTRONIC DISPLAY GAUGE BOARD WITH SERIAL DATA TRANSFER

**Osamu Igarashi, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Jun. 11, 1984, Ser. No. 619,377**
**Claims priority, application Japan, Jun. 13, 1983, 58-105257**
**Int. Cl.[4] G06F *15/20***
**U.S. Cl. 364—424** **3 Claims**




1. A vehicle-mounted electronic display gauge board comprising:

a display device for mounting in a vehicle and having a substrate which has an extended portion;

a microcomputer mounted on said extended portion of said substrate and having an input for receiving external data representing various conditions and an output for producing information;

a display drive circuit mounted on said extended portion of said substrate for driving said display device in response to the information from said microcomputer;

a first terminal mounted on said extended portion of said substrate for outputting an instruction from said microcomputer;

a second terminal mounted on said extended portion of said substrate for inputting said external data through serial transfer into said microcomputer in response to said instruction; and

transmitting means for transmitting said instruction from said first terminal and for transmitting said external data to said second terminal, said transmitting means including

photo-electric converting means for converting the instruction from said first terminal into a light signal and for converting a light signal representing said external data into an electric signal to be applied to said second terminal, and an optical fiber for transmitting said light signal representing said instruction from said photoelectric converting means and for transmitting said light signal representing said external data to said photo-electric converting means;

wherein said photo-electric converting means includes a photo diode for converting the instruction from said first terminal into said light signal, a photo transistor for converting said light signal representing said external data into said electric signal to be applied to said second terminal, a first connector terminal connected to the input of said photo diode and adapted to be connected to said first terminal, a second connector terminal connected to the output of said photo transistor and adapted to be connected to said second terminal, and a connector for accommodating said photo diode, photo transistor, and first and second connector terminals therein, and

wherein an end portion of said optical fiber is divided into two parts and accommodated in said connector body, the divided two parts being optically coupled with said photo transistor and said photo diode in said connector body, respectively.

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**4,713,763**

## REGULATING APPARATUS WHICH INFLUENCES A MIXTURE-FORMING INSTALLATION OF AN INTERNAL-COMBUSTION ENGINE OF A MOTOR VEHICLE

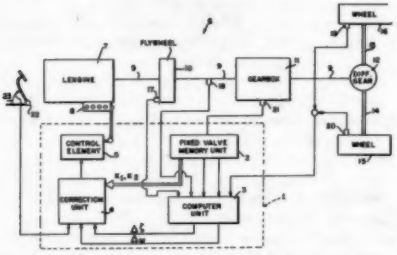
**Rainer Hofmann, Stuttgart, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany**

**Filed Feb. 6, 1985, Ser. No. 698,797**

**Claims priority, application Fed. Rep. of Germany, Feb. 7, 1984, 3404154**

**Int. Cl.⁴ B60K *41/04***

**U.S. Cl. 364—424.1** **3 Claims**




1. In a vehicle having an engine, an explosive-mixture forming device such as a carburetor or injection system, deflectable accelerator pedal means for controlling the speed of the engine, a drive train including a drive shaft, a flywheel on the drive shaft, a gearbox having a plurality of gear stages, and a wheel assembly having at least one driven wheel, the improvement comprising:

first sensor means for detecting deflection of the accelerator pedal means,

second sensor means for detecting an angular velocity of the flywheel,

third sensor means for detecting the torque of the drive shaft,

fourth sensor menas for detecting an angular velocity of the at least one driven wheel of the wheel assembly,

fifth sensor means for detecting the identity of the gear stage in use in the gearbox, and

feedback control means for attenuating vibration in the vehicle drive train, the feedback control means including data processing means for receiving information from the first, second, third, fourth, and fifth sensor means and for monitoring vibrations in the drive train, and regulator means for controlling the explosive-mixture forming device to vary the quantity of explosive-mixture formed to vary thereby the torque of the engine so that vibration due to torsional rigidity of the drive train is lessened substantially,

wherein the data processing means includes a read-only memory unit, responsive to a parameter detected by the fifth sensor means, for supplying auxiliary control parameters including a parameter related to the angular velocity and torque of the drive shaft, a parameter related to the angular velocity of the at least one driven wheel, and a parameter related to a difference in the angular velocity and an angle of twist of the drive train, the control parameters supplied by the read-only memory unit being functionally related to the identity of the gear stage in use in the gearbox as detected by the fifth sensor means so that the control parameters are variable in response to a change in the gear stage, and

wherein the read-only memory unit supplies a plurality of additional auxiliary control parameters including a parameter related to the torsional rigidity of the drive train as a function of the gear stage in use in the gearbox.

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**4,713,764**

## TRANSMISSION CONTROL APPARATUS AND METHOD FOR VEHICLE TRAVELING UPHILL OR DOWNHILL

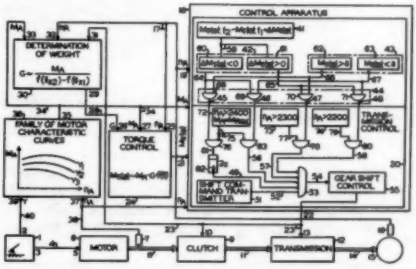
**Alfred Klatt, Wathlingen, Fed. Rep. of Germany, assignor to WABCO Westinghouse Fahrzeugbremsen GmbH, Hanover, Fed. Rep. of Germany**

**Filed Sep. 25, 1984, Ser. No. 654,607**

**Claims priority, application Fed. Rep. of Germany, Sep. 26, 1983, 3334726**

**Int. Cl.⁴ B60K *41/06, 41/28;* G05D *13/64***

**U.S. Cl. 364—424.1** **18 Claims**




1. An on vehicle apparatus to determine the grade of a roadway as such vehicle traverses such roadway, said apparatus comprises:

(a) a means positioned on such vehicle for determining a constant speed drive torque ($M_{stat}$) of such vehicle and for generating a first signal value representative of $M_{stat}$, and

(b) a means connected to receive said first signal for comparing said value of said first signal with a value that is substantially equal to an $M_{stat}$ of such vehicle on a substantially level roadway ($M_{stat=a}$), and for generating a second signal having a value that is representative of an uphill roadway grade when said value of $M_{stat}$ is greater than $M_{stat=a}$, and for generating a third signal having a value that is representative of a downhill roadway grade when said value of $M_{stat}$ is less than $M_{stat=a}$.

11. A method for determining the grade of a roadway as a

vehicle traverses such roadway, said method comprising the steps of:

(a) generating a first signal having a value that is representative of a constant speed drive torque ($M_{stat}$) of such vehicle;

(b) comparing said value of said signal generated in step (a) with a value that is substantially equal to an $M_{stat}$ of such vehicle on a substantially level roadway ($M_{stat=a}$);

(c) generating a second signal having a value that is representative of an uphill roadway grade when said value of $M_{stat}$ is greater than $M_{stat=a}$;

(d) generating a third signal having a value that is representative of a downhill roadway grade when said value $M_{stat}$ is less than $M_{stat=a}$;

(e) inputting said second signal generated in step (c) and said third signal generated in step (d) into a transmission control of such vehicle; and

(f) controlling appropriate gearshift changes in response to said second signal and said third signal inputted to said transmission control in step (e).

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**4,713,765**

## CONTROL SYSTEM FOR AN ENGINE HAVING AN AIR INTAKE PASSAGE

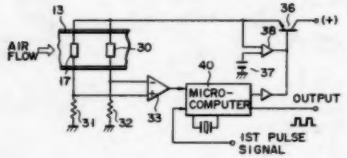
**Tomoaki Abe, Nagoya; Hideya Fujisawa; Norio Omori, both of Kariya; Masumi Kinugawa, Okazaki; Katsunori Ito, Aichi; Susumu Akiyama, Kariya; Tiaki Mizuno, Toyota, and Toshitaka Yamada, Nagoya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Feb. 21, 1985, Ser. No. 704,032**

**Claims priority, application Japan, Feb. 24, 1984, 59-33595; Mar. 7, 1984, 59-43701; Mar. 7, 1984, 59-43702; Apr. 11, 1984, 59-72188; Apr. 16, 1984, 59-76267**

**Int. Cl.[4] F02M *51/00*; G01F *1/68***

**U.S. Cl. 364—431.05** **12 Claims**




1. A control system for an engine having an air intake passage, comprising:

means for generating a first pulse signal at every predetermined angular rotation of said engine;

means disposed in said air intake passage for generating heat in accordance with an electric current supplied thereto and for measuring the temperature of itself;

means for detecting the temperature of air passing through said air intake passage;

means for establishing a reference temperature in accordance with the air temperature detected by said air temperature detecting means;

means for comparing the temperature of said heat generating means with the reference temperature established by said reference establishing means, said comparing means generating an output signal when the temperature of said heat generating means is higher than the reference temperature;

means for generating a second pulse signal having a period starting from the first pulse signal and ending with an output of said comparing means indicating that the temperature of said heat generating means attains the reference temperature, the period of said second pulse signal being indicative of an amount of air sucked into said engine per the predetermined angular rotation of said engine;

means for supplying said heat generating means with the electric current during the period of said second pulse signal so that said heat generating means generates heat during said second pulse signal and dissipates heat thereafter; and

means for supplying said engine with fuel in accordance with the period of said second pulse signal.

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**4,713,766**

## METHOD AND APPARATUS FOR CONTROLLING AIR-FUEL RATIO IN INTERNAL COMBUSTION ENGINE

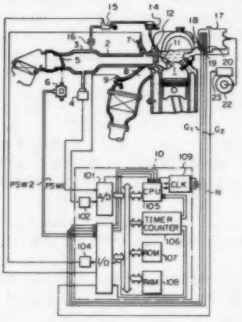
**Nobuyuki Kobayashi; Takashi Hattori, both of Toyota; Katsunori Yagi, Toyoake, and Toshimitsu Ito, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed May 6, 1985, Ser. No. 730,581**

**Claims priority, application Japan, May 7, 1984, 59-089242**

**Int. Cl.[4] F02D *5/02***

**U.S. Cl. 364—431.05** **12 Claims**




1. A method for controlling the air-fuel ratio in an internal combustion engine having a throttle valve therein comprising the steps of:

determining whether or not the opening of said throttle valve reaches a definite value;

fetching a parameter of said engine as a first value showing the load thereof, when the opening of said throttle valve reaches said definite value;

calculating a second value of said parameter of said engine, smaller than said first value;

determining whether or not said parameter of said engine reaches said second value;

calculating whether a first state is set by the opening of the throttle valve reaching said definite value and whether a second state is set by said parameter of said engine reaching said second value;

calculating an air-fuel ratio in response to said first and second states; and

controlling the air-fuel ratio of said engine so that it is brought close to said calculated air-fuel ratio.

7. An apparatus for controlling the air-fuel ratio in an internal combustion engine having a throttle valve therein, comprising:

means for determining whether or not the opening of said throttle valve is smaller than a definite value;

first switch means which is in an on-state only when the opening of said throttle valve is equal to or larger than said definite value;

second switch means which is turned on by the turning-on of said first switch means;

means for fetching a parameter of said engine as a first value showing the load thereof when said first switch means is turned on;

means for calculating a second value of said parameter of said engine smaller than said first value;

means for determining whether or not said parameter of said engine is smaller than said second value;

means for turning off said second switch means, when the opening of said throttle valve is smaller than said second value;

calculating a target air-fuel ratio in response to said second switch means; and

means for controlling the air-fuel ratio of said engine so that it is brought close to said target air-fuel ratio.

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## 4,713,767

## APPARATUS FOR CALCULATING POSITION OF VEHICLE

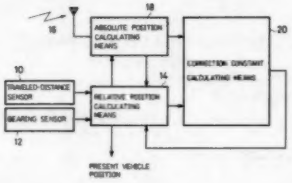
**Akira Sato; Kazuo Sato; Takaharu Saito; Junkoh Shima; Kansei Mizutani, and Toshimasa Mikawa, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed May 6, 1985, Ser. No. 730,572**

**Claims priority, application Japan, May 9, 1984, 59-92590; Nov. 13, 1984, 59-239246**

**Int. Cl.[4] G06F *15/50***

**U.S. Cl. 364—453** **21 Claims**




**21**. A vehicle position calculating apparatus comprising:

(a) traveled-distance sensor means for detecting a distance traveled by a vehicle;

(b) bearing sensor means for detecting a vehicle advancing direction;

(c) relative position calculating means for calculating a relative vehicle position with respect to a reference position, using an inertial navigation method employing the traveled distance detected by said traveled-distance sensor means and the vehicle advancing direction detected by said bearing sensor means;

(d) absolute position calculating means for calculating an absolute vehicle position on the basis of a plurality of sets of fixed-station absolute position information and radio wave arrival direction information which are obtained in succession from a radio wave transmitted from at least one fixed station and the relative vehicle positions calculated by said relative position calculating means, at a plurality of points where the respective sets are obtained, the calculated absolute vehicle position being employed as a new reference position;

(e) correction factor calculating means for calculating a correction factor on the basis of a relationship between the absolute vehicle position obtained by said absolute position calculating means and the relative vehicle position corresponding to the absolute vehicle position and obtained by said relative position calculating means; and

(f) present vehicle position calculating means for calculating a present vehicle position by correcting a relative vehicle position with respect to said new reference position, using said correction factor.

## 4,713,768

## METHOD OF LOCALIZING A MOVING BODY

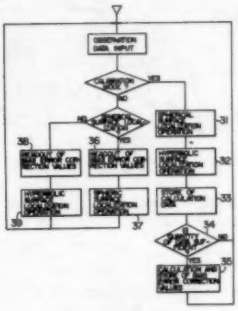
**Michitaka Kosaka, Sagamihara; Katsumi Kawano, Fuchu, and Shoji Miyamoto, Kawasaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jan. 29, 1985, Ser. No. 696,077**

**Claims priority, application Japan, Feb. 20, 1984, 59-28533; Jul. 11, 1984, 59-142284**

**Int. Cl.[4] G01C *15/20*; G01S *3/02***

**U.S. Cl. 364—460** **14 Claims**



**9**. A method of localizing a moving body using a localization system having a plurality of sensors disposed at different places for receiving energy of radiation, such as acoustic waves, electromagnetic waves, etc., emitted by the moving body, and a moving body localization calculation device connected to said plurality of sensors, said method comprising the steps of:

estimating the emission time of the radiation emitted by said moving body using the hyperbolic surface localization method,

estimating locations of said moving body using at least the spherical surface localization method, based on the estimated emission time of the radiation emitted by said moving body, and

calculating a location of said moving body on the basis of reception times of the radiation by said plurality of sensors and the locations of said moving body estimated by the spherical surface localization method.

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## 4,713,769

## METHOD AND APPARATUS FOR LOCATING AND DISPLAYING HISTORICAL INFORMATION WITHIN AN ELECTRONIC POSTAGE METER

**Karen F. Hills, Norwalk, and Howell A. Jones, Southport, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.**

**Filed Sep. 11, 1985, Ser. No. 774,775**

**Int. Cl.[4] G06F *15/20*; G06G *7/48***

**U.S. Cl. 364—464** **4 Claims**

**1**. A method for locating a most recently written record in an electronic postage meter including the steps of:

providing a first non-volatile memory (NVM) capable of storing accounting data which represents the postage meter transactions;

updating the first NVM in real time for each postage transaction to provide a current record of the accounting data for each postage transaction on-the-fly;

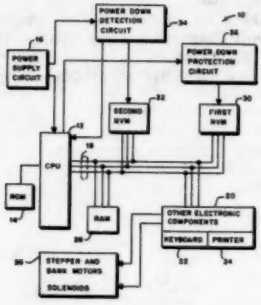
providing a second non-volatile (NVM) capable of storing accounting data representing the postage meter-transactions existing at a down cycle of the postage meter;

detecting a fatal state of the meter, said fatal state allowing programmed access to said first NVM;

locating information in the second NVM;

utilizing the information in the second NVM to locate a written transaction within the first NVM that represents

the most recently written record in the electronic postage meter; and




displaying the most recently written record in response to an external message.

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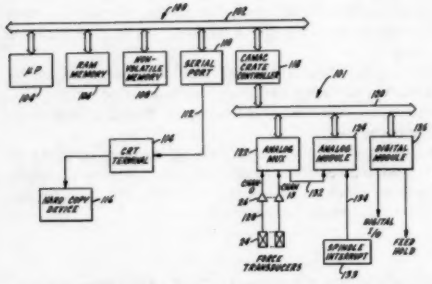
**4,713,770**

## SYSTEM AND METHOD FOR PREVENTING TOOL BREAKAGE

**Michael L. Hayes, Chicago; Paul S. Mahr, Lockport, and John W. Tippie, Naperville, all of Ill., assignors to Kinetic Systems Corporation, Lockport, Ill.**

**Filed Apr. 19, 1985, Ser. No. 725,038**
**Int. Cl.[4] G06F *15/46*; G05B *19/18***
**U.S. Cl. 364—474** **10 Claims**




**6.** In an apparatus for the detection of worn or broken machine tools, the apparatus including a number of machine tools, machine tool drive means capable of serially applying machine tools to a workpiece in a number of machining steps constituting a machining operation, means translating a force applied by any machine tool to the workpiece into a signal, means transmitting the signal, automatic calculator means capable of selecting and receiving said signal and capable of commanding the machine tool drive means to cease applying a machine tool to the workpiece, the improvement comprising:

memory means associated with the machining step automatic calculator means, the memory means capable of storing for each a worn tool limit factor, a broken tool limit factor, a worn tool force limit, a broken tool force limit, a learn cycle force limit, a first array of force value members derived from the receipt and periodic processing of said signal by the automatic calculator means for a first workpiece and subsequent arrays of force value members derived in a like manner for subsequent workpieces;

the automatic calculator means comparing for each machining step each member of said first force value array to the learn cycle force limit for that machining step, the automatic calculator means commanding the machine tool drive means to cease applying a corresponding machine tool to the workpiece in the event that any member of said first force value array exceeds said learn cycle force limit;

the automatic calculator means for each machining step determining a largest member of said first force value array, using said largest member and a previously stored worn tool limit factor to obtain the worn tool force limit for that machining step;

the automatic calculator means, for each machining step, using said largest member of a force value array for a current workpiece and a previously stored broken tool limit factor to obtain as the broken tool force limit for that machining step as applied to the next workpiece;

the automatic calculator means, for each machining step as applied to any subsequent workpiece, receiving and periodically processing said signal into a corresponding subsequent array of force values;

the automatic calculator means comparing each member of the last said subsequent array to scid worn tool force limit and a current broken tool force limit for that machining step, and commanding said machine tool drive means to cease applying the corresponding machine tool to said subsequent workpiece in the event that any member of the last said subsequent array exceeds the worn tool force limit or the current broken tool force limit for that machining step.

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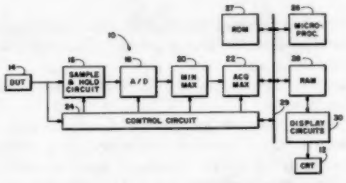
**4,713,771**

## DIGITAL MINIMUM-MAXIMUM VALUE SEQUENCE PROCESSOR

**Roland E. Crop, Banks, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.**

**Filed Oct. 28, 1985, Ser. No. 791,677**
**Int. Cl.[4] G06F *15/20***
**U.S. Cl. 364—487** **9 Claims**




**1.** The method of displaying a representation of the amplitude variations of an analog signal, the method comprising the steps of:

a. determining the minimum and maximum magnitudes of the signal during each of a plurality of successive meaurement periods;

b. comparing at least one of said maximum and minimum magnitudes associated with a selected one of said measurement periods to at least one of said maximum and minimum magnitudes associated with another of said measurement periods; and

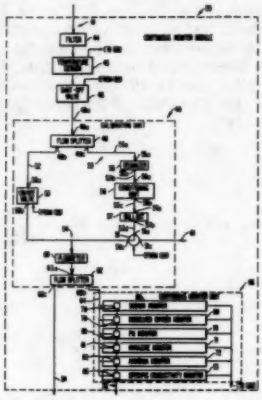
c. displaying a vector on a screen, said vector representing the amplitude variation of said analog signal during said selected measurement period, said vector having a first endpoint position on said screen displaced along a first screen axis according to the maximum magitude determined for said selected measurement period and a second endpoint position on said screen displaced along said first axis according to the minimum magnitude determined for said selected measurement period, said endpoints being ordered along a second screen axis, orthogonal to the first screen axis, according to at least one said comparison

4,713,772

## AUTOMATIC ON-LINE CHEMISTRY MONITORING SYSTEM HAVING IMPROVED CALIBRATION UNIT

Gerald L. Carlson, Mt. Lebanon Township, Allegheny County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 18, 1985, Ser. No. 799,038
Int. Cl.[4] G06F 15/46; G01N 1/16
U.S. Cl. 364—496 12 Claims



1. A system for automatic, continuous online monitoring of power plant steam cycle water at any of a plurality of different points in the power plant steam cycle, comprising:

means for supplying, from at least a selected one of the plurality of points in the power plant steam cycle, a corresponding, selected influent fluid sample stream;

for each selected influent fluid sample stream, a respectively associated continuous monitor module comprising:

means for monitoring the temperature of the influent fluid sample stream and generating a corresponding temperature signal,

means for continuously monitoring at least one selected chemical characteristic of the influent fluid sample stream from a first flow path and a second flow path and, in response thereto, generating a corresponding continuous monitor signal, and

calibration means, including conditioning means for creating a pressure differential in the influent fluid sample stream from the second flow path and for utilizing the pressure differential to inject a mixed standard solution into the influent fluid sample stream to provide a conditioned influent fluid sample stream having predetermined chemical characteristics, and means selectively operable to establish the first and second fluid sample stream flow paths responsive to calibration actuation signals, the first flow path providing at least a portion of the influent fluid sample stream to said continuously monitoring means, and the second flow path providing the influent fluid sample steam to said conditioning means and at least a portion of the conditioned influent fluid sample stream to said continuously monitoring means;

means for receiving a fractional portion of each selected influent fluid sample stream and monitoring the cation conductivity thereof, and, in response thereto, generating a corresponding cation conductivity signal and providing a corresponding altered fluid sample stream from which cations have been removed;

ion chromatograph means for monitoring at least one chemical characteristic of each selected influent fluid sample stream and at least one selected chemical characteristic of the corresponding altered fluid sample stream responsive to a chromatograph actuation signal, and, in response to said chromatograph actuation signal, generating corresponding first and second chromatograph signals; and

control means, responsive to at least the temperature signal, the cation conductivity signal and the first and second chromatograph signals corresponding to each selected influent fluid sample stream, for calculating the cation conductivity of the respective, selected influent fluid sample stream using predetermined conductivity equations, comparing the calculated cation conductivity with the monitored cation conductivity for the respective influent fluid sample stream, and generating said calibration actuation signals and said chromatograph actuation signal responsive to said comparison, for supply to said respective continuous monitor module and said ion chromatograph means.

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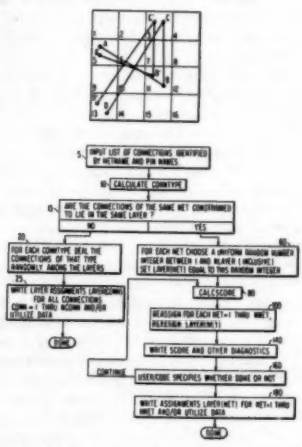
4,713,773

## METHOD FOR DISTRIBUTING WIRE LOAD IN A MULTILAYER PACKAGE AND THE RESULTING PRODUCT

John F. Cooper, Saratoga, Calif.; Edward S. Kirkpatrick, Croton-on-Hudson, and Ralph Linsker, Scarsdale, both of N.Y., assignors to International Business Machine Corporation, Armonk, N.Y.

Filed Aug. 10, 1984, Ser. No. 639,570
Int. Cl.[4] G06F 15/32, 7/00
U.S. Cl. 364—491 12 Claims



1. In a multilayer interconnection board, a method for distributing connections comprising the steps of:

(a) reading connection data relating to the location of pins on the interconnection board at which the connections terminate;

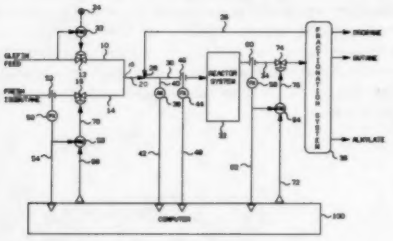
(b) defining a connection type for each connection based on the locations of the pins of said connection; and

(c) distributing connections of one or more connection types among the layers of the interconnection board such that for each of these connection types, the difference between (i) the maximum number of connections of that type distributed to any layer and (ii) the minimum number of connections of that same type distributed to any layer is less than or equal to 1.

## 4,713,774
## ALKYLATION REACTOR QUALITY CONTROL

Gary L. Funk, and William B. Bard, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 13, 1986, Ser. No. 839,245
Int. Cl.[4] G05D 11/13, 21/02
U.S. Cl. 364—500 9 Claims



1. Apparatus comprising:
an alkylation reactor;
a fractional distillation column means;
means for withdrawing a mixture containing unreacted isoparaffin as a reactor effluent stream from said alkylation reactor, and for providing said reactor effluent stream as a feed to said fractional distillation column means wherein at least a portion of said unreacted isoparaffin is separated to form a predominately isoparaffin containing recycle stream;
means for combining an isoparaffin-containing fluid stream with an olefin-containing fluid stream to form a combined isoparaffin and olefin stream;
means for combining said recycle stream and said combined paraffin and olefin stream to form a combined feed stream and for providing said combined feed stream to said alkylation reactor;
means for establishing a first signal representative of the desired isoparaffin-to-olefin ratio in said combined feed stream;
means for establishing a second signal representative of the flow rate of said combined feed stream;
means for establishing a third signal representative of the flow rate of said isoparaffin-containing fluid stream;
means for establishing a fourth signal representative of the flow rate of said reactor effluent stream;
analyzer means for detecting the concentration of olefin supplied through said combined feed stream, and for detecting the concentration of isoparaffin supplied through said combined feed stream, and for detecting the molecular weight of said combined feed stream;
computer means responsive to said analyzer means and to said first, second, third and fourth signals for calculating a first control signal which is representative of the flow rate of said isoparaffin containing fluid stream required to maintain the actual isoparaffin to olefin ratio in said combined feed stream substantially equal to the desired isoparaffin to olefin ratio represented by said first signal, and for calculating a second control signal which is representative of the flow rate of said reactor effluent stream which will offset flow changes in said isoparaffin containing fluid stream by corresponding flow changes in said reactor effluent stream, whereby the liquid level in said alkylation reactor will be unaffected by changes in the flow rate of said isoparraffin containing fluid stream required to maintain the ratio represented by said first signal;
means for manipulating the flow rate of said isoparaffin containing fluid stream in response to said first control signal, to thereby maintain the actual isoparaffin to olefin ratio in said combined feed stream substantially equal to the ratio represented by said first signal;
means for manipulating the flow rate of said reactor effluent stream in response to said second control signal, to thereby maintain the liquid level in said alkylation reactor essentially constant.

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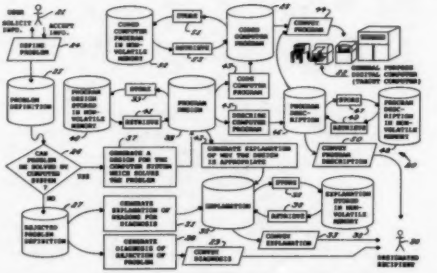
## 4,713,775
## INTELLIGENT ASSISTANT FOR USING AND OPERATING COMPUTER SYSTEM CAPABILITIES TO SOLVE PROBLEMS

A. Carlisle Scott, Palo Alto; Jan E. Clayton, Los Altos Hills, both of Calif., and Jacques Garnier, Courbevoie, France, assignors to Teknowledge, Incorporated, Palo Alto, Calif. and Compagnie Generale de Geophysique, Colo.

Filed Aug. 21, 1985, Ser. No. 768,012
Int. Cl.[4] G06F 15/20; G01V 1/28
U.S. Cl. 364—513 70 Claims



1. A computer system comprising, in combination,
means for receiving a specification of a problem from a user,
a memory having stored therein predefined knowledge about methods of solving problems relating to a certain problem area including knowledge about methods of employing certain capabilities of a target computer system to solve problems relating to said problem area, and
means for using said predefined knowledge to determine whether it is impractical to design a computer program for said target computer system that uses said capabilities of said target computer system to solve the problem specified by said user, so that said problem specified by said user is rejected as inappropriate when it is impractical to design a computer program for using the capabilities of said target computer system to solve said problem.

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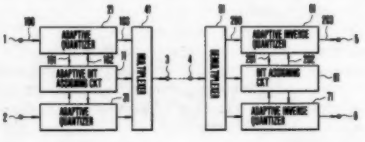
## 4,713,776
## SYSTEM FOR SIMULTANEOUSLY CODING AND DECODING A PLURALITY OF SIGNALS

Takashi Araseki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed May 16, 1984, Ser. No. 610,729
Claims priority, application Japan, May 16, 1983, 58-85293; May 19, 1983, 58-88007
Int. Cl.[4] G10L 5/00
U.S. Cl. 364—513.5 8 Claims



1. A two channel simultaneous coding and decoding system comprising:
an encoder unit including:
first adaptive quantizing means inputted with a first digital

signal through a first channel for quantizing said first digital signal while sequentially updating its step size and outputting a first output signal and a first step size signal indicative of step size of said first adaptive quantizing means;

second adaptive quantizing means inputted with a second digital signal through a second channel for quantizing said second digital signal while sequentially updating its step size and outputting a second output signal and a second step size signal indicative of step size of said second adaptive quantizing means;

adaptive bit assigning means connected to said first and second adaptive quantizing means for receiving said first and second step size signals, respectively and adaptively assigning corresponding numbers of bits for said first and second channels, said adaptive bit assigning means further outputting an adaptive bit assignment signal; and

multiplexer means supplied with said first and second output signals and said adaptive bit assignment signal for rearranging said first and second output signals in accordance with said adaptive bit assignment signal and delivering an encoder input signal; and

a decoder unit including:

demultiplexer means for receiving and rearranging said encoder output signal and providing first and second outputs;

first adaptive inverse quantizing means supplied with said first output of said demultiplexer means for inversely quantizing said first output while sequentially updating its step size; and

second adaptive inverse quantizing means inputted with said second output of said demultiplexer means for inversely quantizing said second output while sequentially updating its step size,

wherein information relating to step size of said first and second inverse adaptive quantizing means is generated only in said decoder unit.

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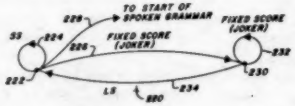
**4,713,777**

## SPEECH RECOGNITION METHOD HAVING NOISE IMMUNITY

**John W. Klovstad, Dorchester; Chin-Hui Lee, Cambridge, and Kalyan Ganesan, Burlington, all of Mass., assignors to Exxon Research and Engineering Company, Florham Park, N.J.**

**Filed May 27, 1984, Ser. No. 593,892**
**Int. Cl.[4] G10L 5/00**
**U.S. Cl. 364—513.5** **7 Claims**




1. In a speech recognition apparatus wherein speech units are each characterized by a sequence of template patterns, and having

means for processing a speech input signal for repetitively deriving therefrom, at a frame repetition rate, a plurality of speech recognition acoustic parameters, and

means responsive to said acoustic parameters

for generating likelihood costs between said acoustic parameters and said speech template patterns, and

for processing said likelihood costs for determining the speech units in said speech input signal,

a method for inhibiting a response to nonvocabulary utterances in a speech input for which template patterns have not been created, comprising the steps of

repeatedly, at a frame repetition rate, generating acoustic parameters representing said speech input,

generating likelihood costs at each frame time for said acoustic parameters and said template patterns, said template patterns including a pattern representing silence,

beginning a normal speech recognition process whenever said cost for an active template pattern is better than a predetermined threshold value, and

reverting to a non-speech recognition process whenever said cost of said template patterns, including silence, is worse than said predetermined threshold value.

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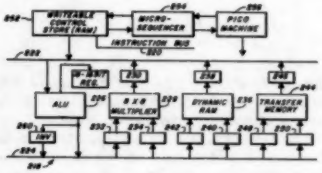
**4,713,778**

## SPEECH RECOGNITION METHOD

**James K. Baker, West Newton, Mass., assignor to Exxon Research and Engineering Company, Florham Park, N.J.**

**Filed Mar. 27, 1984, Ser. No. 593,895**
**Int. Cl.[4] G10L 5/00**
**U.S. Cl. 364—513.5** **3 Claims**




1. In a speech recognition apparatus wherein speech units are each characterized by a sequence of template patterns, and having

means for processing a speech input signal for repetitively deriving therefrom, at a frame repetition rate, a plurality of speech recognition acoustic parameters, and

means responsive to said acoustic parameters

for generating likelihood costs between said acoustic parameters and said speech template patterns, and

for processing said likelihood costs for determining the speech units in said speech input signal,

a method of template matching and cost processing for recognizing the correspondence of said speech input signal and said template patterns, said method comprising the steps of

characterizing the allowable possible sequences of speech units as a grammer graph structure having a beginning node, an ending node and a plurality of intermediate nodes, all said nodes being connected by grammar arcs to at least one other node,

initializing each said node with a high cumulative likelihood cost designating a bad score,

generating likelihood costs representing the similarity of said acoustic parameters and selected ones of said template patterns,

associating with each said node, at each frame time, a cumulative score corresponding to an accumulated template likelihood score in reaching said node, and

generating a recognition decision when said cumulative score associated with the ending node is better than the cumulative score associated with any other node,

storing a source representation of said grammar graph in a changeable memory of said responsive means,

replacing said memory data with a representation of a second grammar graph, and

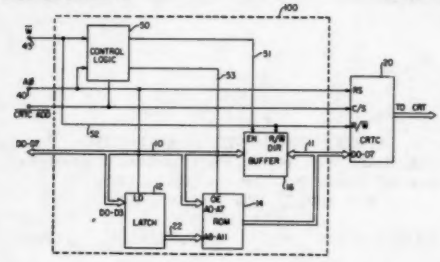
generating a speech recognition decision based upon the second grammar graph,

whereby said grammar source representing is software interchangeable and can be edited.

## 4,713,779
## VIDEO CONVERTER

**Alessandro Graciotti, Cupertino, and Herbert A. Kutscha, Los Gatos, both of Calif., assignors to Ing.C. Olivetti & Co. S.p.A., Ivrea, Italy**

**Filed Mar. 8, 1985, Ser. No. 709,442**
**Int. Cl.[4] G06F *15/68*; H04N *5/14***
**U.S. Cl. 364—521** **12 Claims**




1. In an improved computer display adapted to be controlled by programmable display controller means, said display having a computer data bus for providing data to program said controller means with display parameters required by said display, and a controller data bus for transferring said data to said controller means, said display having predetermined characteristics requiring programming of said controller means with parameters defined by a first value of said data, said computer data bus being adapted to supply data having a second value defined for programming the controller means for another display having characteristics different from said predetermined characteristics, wherein the improvement includes a device for converting data having said second value into data having said first value, said device comprising:

memory means interposed between said computer data bus and said controller data bus and being connected to be addressed by data having said second value for providing to said controller data bus data having said first value; and

control logic means connected to said memory means for selectively enabling and disabling said memory means, whereby said controller means is always programmed according to said first value.

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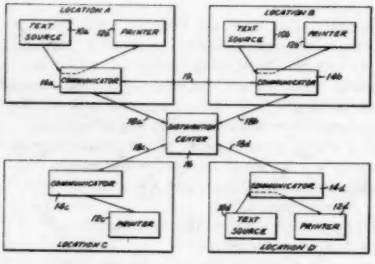
## 4,713,780
## ELECTRONIC MAIL

**Thomas G. Schultz, Chicago, Ill.; Andrew Gross, Bridgewater, N.J.; Barbara Pappas, Massapequa Park; George D. Shifrin, New York, both of N.Y., and Lois Mack, Union City, N.J., assignors to Express Communications, Inc., New York, N.Y.**

**Filed Apr. 15, 1985, Ser. No. 723,053**
**Int. Cl.[4] G06K *15/02*; H04L *15/34***
**U.S. Cl. 364—514** **62 Claims**




1. A method of transmitting from a source location to a remote location the text data normally coupled from a source to a printer for displaying that text data at said remote location, comprising the steps of supplying one or more successive pages of the text data from the source; identifying the horizontal and vertical positions normally printed on each page of respective characters included in the text data supplied by said source; storing the identity of each character and its horizontal and vertical positions; transmitting to said remote location the identity of each character and its horizontal and vertical positions; converting the identities of the characters and their horizontal and vertical positions to display commands for driving a display device at said remote location; and supplying said display commands to said display device to display a substantially conforming line-by-line copy of the text data supplied by said source.

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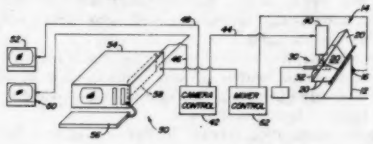
## 4,713,781
## GRAIN DAMAGE ANALYZER

**Lawrence J. Brizgis, Moline, Ill.; Daniel B. Keleher, Bettendorf, Iowa, and Vernon D. Bandelow, Cambridge, Ill., assignors to Deere & Company, Moline, Ill.**

**Filed Sep. 19, 1985, Ser. No. 777,886**
**Int. Cl.[4] G06F *15/20*; G06G *7/48*; H01J *40/14***
**U.S. Cl. 364—552** **10 Claims**
**MICROFICHE APPENDIX INCLUDED**
**(1 Microfiche, 26 Pages)**




1. A grain damage measuring system comprising:

a lamp for illuminating a grain sample with long wavelength ultraviolet electromagnetic radiation so that damaged portions of the grain may be distinguished from undamaged portions of the grain on the basis of electromagnetic radiation emitted by the sample and reflected from the sample;

a video camera receiving the radiation reflected and emitted from the grain sample, forming an image therefrom and generating a video signal representing the image; and

a signal processor comprising:

means for digitizing the video signal into a plurality of discrete picture elements (pixels), each pixel having a value representing an intensity of a corresponding part of the image; and

means for determining the number of pixels having values which exceed a predetermined threshold, said threshold being set so that pixel values exceeding the threshold correspond substantially only to portions of the image which represent damaged portions of the grain sample, said number being indicative of damage to the grain sample.

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## 4,713,782
## METHOD AND APPARATUS FOR MEASURING A TRANSFER FUNCTION

**Ray Blackham, Marysville, Wash., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Aug. 23, 1984, Ser. No. 644,309**
**Int. Cl.[4] G06F *15/20, 7/34***
**U.S. Cl. 364—553** **10 Claims**

1. A method for integrating a response signal over an integration period, comprising the steps of:

generating a stimulus signal at a stimulus frequency;

applying the stimulus signal to a device;

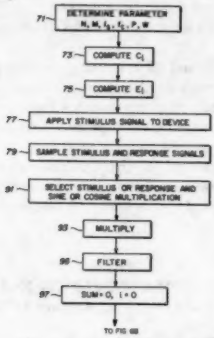
acquiring the response signal from the device;

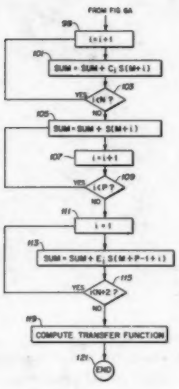
sampling the response signal at a clock rate and thereby generating a plurality of response signal samples;

separating the signal samples into preceding, central and succeeding sectors;

generating a preceding weighting polynomial and coefficients thereof;

generating a succeeding weighting polynomial and coefficients thereof;




multiplying the preceding sector of response signal samples by the coefficients of the preceding weighting polynomial;

multiplying the succeeding sector of response signal samples by the coefficients of the succeeding weighting polynomial; and

summing the central sector of response signal samples, the multiplied preceding sector of response signal samples and the multiplied sector of succeeding response signal samples.

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**4,713,783**

## DIGITAL TEMPERATURE INDICATING SYSTEM

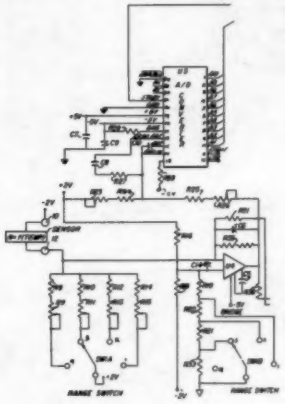
**Taylor C. Fletcher, 1534 Sunny Crest Dr., Fullerton, Calif. 92635**

**Filed Jun. 24, 1985, Ser. No. 747,882**

**Int. Cl.[4] G01K** *7/00, 7/26*

**U.S. Cl. 364—557** **6 Claims**

1. A digital temperature indicating system comprising: a temperature sensor having an electrical resistance which is a function of the temperature being sensed; a bridge network connected to said sensor and including at least one variable resistance means for balancing the bridge at a particular resistance of said sensor representing a predetermined temperature; an analog-to-digital converter; first circuitry connecting the bridge network to the analog-to-digital converter for applying analog output signals of said bridge to said converter to be converted into corresponding digital signals by said converter; a memory connected to said converter to be addressed by said digital signals to produce corresponding temperature-indicating digital signals in response thereto; a display means; second circuitry connected to said memory and to said display means and responsive to said temperature-indicating signals to cause the display means to exhibit temperature readings; first further



variable resistance means included in said first circuitry for controlling the output of said analog-to-digital converter to cause said display means to exhibit a selected temperature reading in a selected temperature range for a balanced condition of said bridge; and second further variable resistance means included in said first circuitry for controlling the output of said analog-digital converter to cause said display means to exhibit a second selected temperature in the selected temperature range for a particular unbalanced condition of said bridge.

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**4,713,784**

## ALIGNMENT APPARATUS

**Naoki Ayata, Machida, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 21, 1984, Ser. No. 623,088**

**Claims priority, application Japan, Jul. 4, 1983, 58-120192; Jul. 7, 1983, 58-122344; Jul. 16, 1983, 58-130099; Sep. 6, 1983, 58-162602; Sep. 6, 1983, 58-162603**

**Int. Cl.[4] G06F** *15/46*

**U.S. Cl. 364—559** **9 Claims**

1. An apparatus for aligning two objects in a predetermined relationship using alignment marks, comprising:

means for producing a beam used to illuminate the alignment marks;

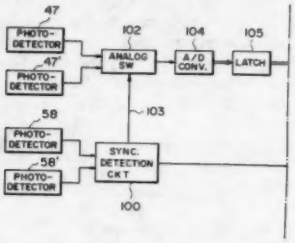
means for detecting an area on which the beam impinges;

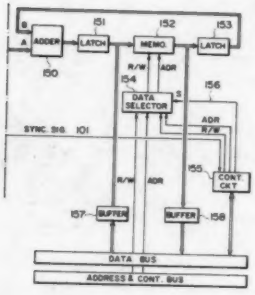
means for effecting scanning by relative movement between the beam and the alignment marks;

means for sequentially converting analog data produced by said detecting means in accordance with the scanning to digital data at predetermined intervals, while the scanning is being effected; and

means for processing the digital data from said converting means to align the two objects, wherein said processing

means includes a first memory for storing data corresponding to a peak of the analog data among the digital




data of said converting means upon completion of the scanning deflection.

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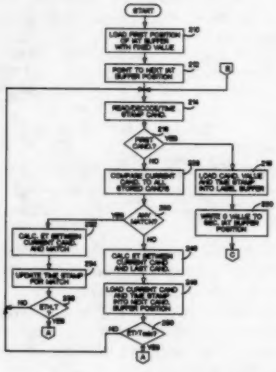
**4,713,785**

## METHOD OF INHIBITING PROCESSING OF DUPLICATIVE CODED LABEL SIGNALS

**Douglas C. Antonelli, Raleigh, N.C.; Patricia M. Branscomb, Woodbridge, Va.; Eric C. Broockman, Raleigh, N.C.; LeRoy D. Dickson, Raleigh, N.C.; Caralee P. Koppel, Raleigh, N.C.; Richard Ossowski, Raleigh, N.C., and Olen L. Stokes, Jr., Cary, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Apr. 18, 1985, Ser. No. 724,435**
**Int. Cl.[4] G06F *15/24*; G06K *7/10***
**U.S. Cl. 364—569** **15 Claims**




1. For use in a scanner for scanning and decoding labels on items, a method of inhibiting the transfer to an associated terminal of duplicative signals produced by a label carried on a single item, said method comprising the steps of:

recording a time of arrival and a value for each of a plurality of different decoded label candidates;

calculating inter-item arrival times (IAT) for successive pairs of candidates actually transferred to the terminal;

calculating an average IAT for the last N transferred candidates where N is a positive integer;

selecting a lockout time as a function of the calculated average IAT;

calculating an elapsed time between a current label candidate and the most recent recorded candidate where the current candidate does not match a recorded candidate or between the current candidate and a recorded candidate matching the current candidate; and

inhibiting the transfer of the current candidate when it matches the previously transferred candidate and the calculated elapsed time is within the selected lockout time.

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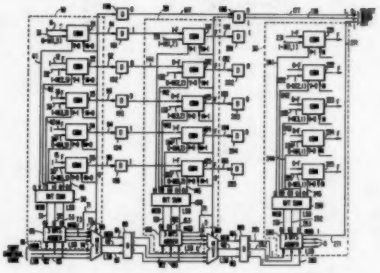
**4,713,786**

## DIGITAL HARDWARE SELECTION FILTER

**James A. Roskind, Palm Bay, Fla., assignor to Harris Corporation, Melbourne, Fla.**

**Filed Feb. 15, 1985, Ser. No. 702,136**
**Int. Cl.[4] G06F *7/02***
**U.S. Cl. 364—715** **39 Claims**



1. A signal processing apparatus for processing a plurality N of M multi-component information signals to produce therefrom a multi-component output signal representative of a controllably selected one of said mulit-component information signals comprising:

a multiplicity M of signal component processing stages, each respective one of which is associated with a prescribed one of the components of said multi-component information signals and is coupled to receive that prescribed signal component of each of said plurality of multi-component information signals and a respective control signal, so as to produce therefrom that signal component of said multi-component output signal that is associated with said prescribed one of said components of the selected one of said multi-component information signals;

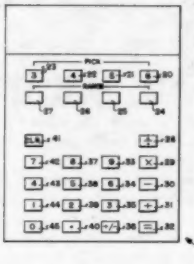
means, responsive to a variable input signal representative of a selected pth largest of said plurality of multi-component information signals to which said selected one of said multi-component information signals corresponds, for coupling respective control signals to said multiplicity of signal processing stages; and

combining means for combining the respective M signal components produced by said multiplicity M of signal component processing stages, whereby from said multiplicity M of signal component processing stages there is produced said selected pth largest of said multi-component information signals.

## 4,713,787
## ELECTRONIC NUMERIC GENERATOR

**Edward J. Rapp, Cleveland Heights, Ohio, assignor to Fork, Inc., New Philadelphia, Ohio**

**Filed Aug. 31, 1984, Ser. No. 646,123**
**Int. Cl.[4] G06F *1/02, 15/28;* A63B *71/00;* A63F *1/00***
**U.S. Cl. 364—717** **4 Claims**



4. Apparatus for numerical generation and calculation, comprising:

a keyboard having a plurality of keys thereon;

a first set of keys of said plurality of keys on said keyboard operative to select a quantity of randomly generated numbers;

a second set of keys of said plurality of keys in said keyboard operative to define a range containing all of said randomly generated numbers;

a display presenting visual indicia of said randomly generated numbers;

means connected to said first and second sets of keys for generating said quantity of randomly generated numbers within said range, generating a seed number from which said randomly generated numbers are evolved, and assuring that said quantity of randomly generated number does not include any two (2) identical numbers; and

wherein said keyboard further includes a set of keys bearing the digits 0–9 and the indicia of the four (4) basic arithmetic functions.

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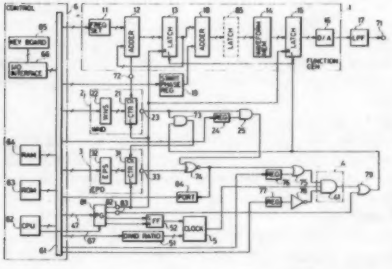
## 4,713,788
## BURST SIGNAL GENERATOR

**Toshiharu Kasahara, Okegawa; Takayuki Ogami, and Hitoshi Kitayoshi, both of Gyoda, all of Japan, assignors to Takeda Riken Kogyo Kabushikikaisha, Tokyo, Japan**

**Filed Aug. 28, 1984, Ser. No. 644,961**
**Claims priority, application Japan, Sep. 8, 1983, 58-165768; Sep. 20, 1983, 58-173755**
**Int. Cl.[4] G06F *1/02;* G10H *1/00***
**U.S. Cl. 364—718** **16 Claims**



1. A burst signal generator, comprising:

a waveform memory having stored therein one cycle of a waveform at fixed phase intervals;

frequency setting means for setting therein a frequency value corresponding to a frequency of a burst signal to be generated;

a clock signal source for generating a clock signal;

accumulating means for accumulating the frequency value set in the frequency setting means upon each occurrence of the clock signal from the clock signal source to produce an accumulated value;

wave-number setting means for setting therein a number of cycles of the burst signal to be generated;

start phase setting means for setting therein a phase start value corresponding to a start phase of the burst signal;

start phase adding means, connected to said waveform memory, for adding the phase start value from said start phase setting means and the accumulated value from said accumulating means to provide an added value as an address for readout of said waveform memory;

a D/A converter, connected to said waveform memory, for converting the waveform data read out of the waveform memory into an analog signal;

wave-number detecting means for counting a number of cycles of the waveform read out of the waveform memory and producing a count value and for generating a wave-number count end signal when the count value reaches a predetermined number;

end phase setting means for setting therein an end value corresponding to an end phase of the burst signal to be stopped thereat; and

end phase detecting means, connected to the clock signal source, for counting the clock signal a number of times corresponding to the end value, generating a phase count end signal and stopping generation of the burst signal in dependence upon the phase count'end signal after generation of the wave-number count signal.

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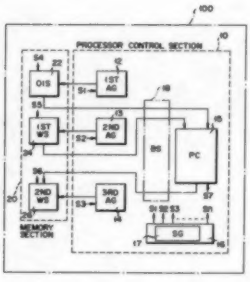
## 4,713,789
## PROCESSOR AND METHOD OF PROCESSING IMAGE DATA

**Kaoru Suzuki, Ootawara, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Oct. 26, 1983, Ser. No. 545,777**
**Claims priority, application Japan, Oct. 29, 1982, 57-190432**
**Int. Cl.[4] G06F *7/38;* G06K *9/54, 9/60***
**U.S. Cl. 364—724** **6 Claims**




1. An apparatus for performing a processing operation on image data, comprising:

memory means for storing data, including first, second and third storage means, said first storage means for storing first image data, said second storage means for storing second image data, and said third storage means for storing third image data;

processing circuit means, having at least two inputs and an output, for performing an arithmetic operation on data at

said two inputs to produce processed image data at said output;

first, second and third data bus lines, said first data bus line coupled to said first storage means, said second data bus line coupled to said second storage means, and said third data bus line coupled to said third storage means;

data bus line selecting means, coupled to said first, second, and third data bus lines at opposite ends from said storage means, for selectively connecting each of said first, second and third data bus lines to one of said inputs and said output of said processing circuit means, respectively, in any order, so that any of said first, second, and third storage means can be connected to any of said inputs and output of said processing means;

first address generating means for generating an address for said first storage means so that said first image data is supplied from said first storage means to one of said inputs or from said output of said processing circuit means to said first storage means through said first data bus line;

second address generating means for generating an address for said second storage means so that said second image data is supplied from said second storage means to one of the inputs or from said output of said processing circuit means to said second storage means through said second data bus line; and

third address generating means for defining addresses of said third storage means so that said third image data is supplied from said third storage means to one of said inputs or from said output of said processing circuit means to said third storage means through said third data bus line, said output of said processing circuit means being indicative of at least one of said addresses of said first, second and third address generating means based on a connecting mode of said data bus line selecting means.

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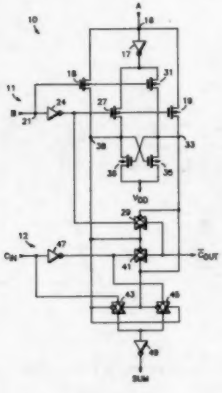
**4,713,790**

## EXCLUSIVE OR/NOR GATE HAVING CROSS-COUPLED TRANSISTORS

**Kevin L. Kloker, Arlington Heights, and Ronald H. Cieslak, Chicago, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Jul. 31, 1985, Ser. No. 760,841**
**Int. Cl.[4] G06F *7/50*; H03K *19/21***
**U.S. Cl. 364—784** **5 Claims**



1. A logic gate for receiving first and second input signals at first and second input terminals, respectively, and providing exclusive OR and exclusive NOR signals of the input signals at first and second output terminals, respectively, comprising:

first inverter means having an input coupled to the first input terminal, and an output;

second inverter means having an input coupled to the second input terminal, and an output;

a first transistor of a first conductivity type having a first current electrode coupled to the output of the first inverter means, a second current electrode coupled to the first output terminal, and a control electrode coupled to the second input terminal;

a second transistor of the first conductivity type having a first current electrode coupled to the first input terminal, a second current electrode coupled to the second output terminal, and a control electrode coupled to the second input terminal;

a third transistor of the first conductivity type having a first current electrode coupled to the first input terminal, a second current electrode coupled to the first output terminal, and a control electrode coupled to the output of the second inverter means;

a fourth transistor of the first conductivity type having a first current electrode coupled to the output of the first inverter means, a second current electrode coupled to the second output terminal, and a control electrode coupled to the output of the second inverter means;

a fifth transistor of a second conductivity type having a first current electrode coupled to the first output terminal, a second current electrode coupled to a terminal for receiving a power supply voltage, and a control electrode coupled to the second output terminal; and

a sixth transistor of the second conductivity type having a first current electrode coupled to the second output terminal, a second current electrode coupled to the terminal for receiving the power supply voltage, and a control electrode coupled to the first output terminal.

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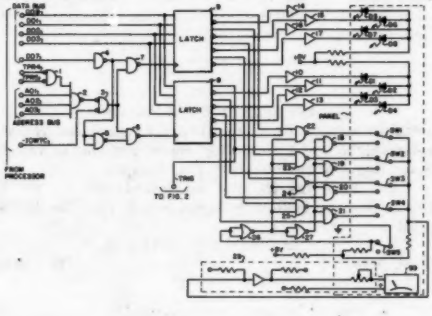
**4,713,791**

## REAL TIME USAGE METER FOR A PROCESSOR SYSTEM

**Robert A. Saluski, Phoenix, Ariz., assignor to GTE Communication Systems Corporation, Phoenix, Ariz.**

**Filed Sep. 24, 1984, Ser. No. 653,190**
**Int. Cl.[4] G06F *11/32***
**U.S. Cl. 364—900** **20 Claims**



1. A real time usage meter for measuring the execution time of processing system software, said real time usage meter comprising:

display means providing for visual display;

means for indicating being periodically transmitted by said processing system, said means for indicating including a status display word having a plurality of status bits, each status bit indicating the execution of a particular type of software task;

means for storing connected to said processing system, said means for storing being cyclically operated to store said status display data word;

gating means connected to said means for storing and to said display means, said gating means being cyclically oper-

ated to transmit said stored status display data word, indicating an instantaneous execution of said types of software tasks, to said display means for visual display, said cyclic transmission of said status bits over a predetermined period of time representing said execution time of said software tasks; and

switching means connected between said gating means and said display means, said switching means being operated in response to said status display data word to selectively transmit predetermined ones of said status bits to said display means for visual display.

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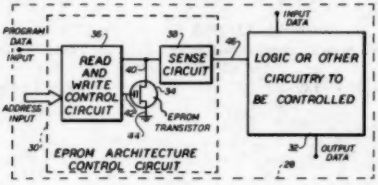
4,713,792

## PROGRAMMABLE MACROCELL USING EPROM OR EEPROM TRANSISTORS FOR ARCHITECTURE CONTROL IN PROGRAMMABLE LOGIC CIRCUITS

Robert F. Hartmann, San Jose; Yiu-Fai Chan, Saratoga; Robert J. Frankovich, Cupertino; Jung-Hsing Ou, Sunnyvale; Hock C. So, Milpitas, and Sau-Ching Wong, Hillsborough, all of Calif., assignors to Altera Corporation, Santa Clara, Calif.

Filed Jun. 6, 1985, Ser. No. 742,089
Int. Cl.[4] G06F *1/00*
U.S. Cl. 364—900 19 Claims




1. A programmable macrocell in an integrated circuit device comprising:

electronic circuit means responsive to a program control signal and operative to perform a particular operation selected by said control signal on an input data signal and to develop a commensurate output data signal, said electronic circuit means including an inversion control circuit having exclusive NOR gate means with one input thereof receiving said control signal and another input thereof receiving said input data signal; and

architecture control means including one or more architecture control circuits each having

a programmable EPROM device having gate, drain and source electrodes and which when programmed generates a logic signal of a first state and when unprogrammed generates a logic signal of a second state,

read and write control means connected to said EPROM device and responsive to an input program data signal and a corresponding address signal and operative to program said EPROM device by applying a programming potential thereto, and

sense means connected to said EPROM device for sensing the programmed or unprogrammed state of said EPROM device and for developing a commensurate control signal for input to said inversion control circuit,

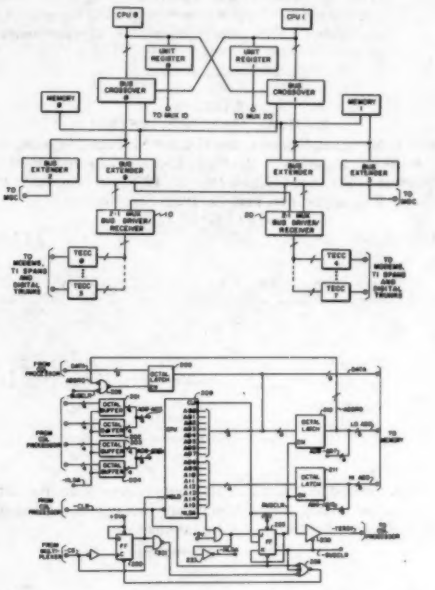
whereby in response to said control signal said inversion control circuit causes an input data signal to be inverted when an associated EPROM device is in said first state and to be not inverted when said EPROM device is in said second state.

4,713,793

## CIRCUIT FOR CCIS DATA TRANSFER BETWEEN A CPU AND A PLURALITY OF TERMINAL EQUIPMENT CONTROLLERS

Joseph A. Conforti, Phoenix, Ariz., assignor to GTE Communication Systems Corporation, Phoenix, Ariz.

Filed Dec. 2, 1985, Ser. No. 803,694
Int. Cl.[4] G06F *9/00*
U.S. Cl. 364—900 14 Claims




1. In a Common Channel Interoffice Signalling (CCIS) system, a circuit for direct CCIS data transfer between an active CPU of a duplex pair of CPUs and a plurality of terminal equipment controllers, said circuit comprising:

first and second multiplexer means, each corresponding to said first and second CPU bus means, each said multiplexer means being connected to said active CPU via said corresponding first and second CPU bus means and said first multiplexer means being connected to a first plurality of said terminal equipment controllers and said second multiplexer means being connected to a second plurality of said terminal equipment controllers, each said multiplexer means being operated in response to said active CPU to connect said active CPU to each of said connected terminal equipment controllers;

each said terminal equipment controller including:

local CPU means;

memory means;

local bus means connected to said local CPU means and to said memory means, said local bus means being operated to transmit an address to said memory means and to transmit data from said local CPU means to said memory means and to transmit data from said memory means to said local CPU means;

requesting means connected to said active CPU via said corresponding multiplexer means and connected to said local CPU means, said requesting means being operated in response to a select signal transmitted from said active CPU to produce a request signal for transmission to said local CPU means;

said local CPU means being operated in response to said

request signal to disconnect itself from said local bus means and to produce an acknowledge signal;

bus control means connected to said local CPU means, to said local bus means and to said first and second CPU bus means via said corresponding multiplexer means, said bus control means being operated in response to a first value of said acknowledge signal to connect said first CPU bus means to said local bus means for said direct CCIS data transmission to said memory means and said bus control means being operated in response to a second value of said acknowledge signal to connect said second CPU bus means to said local bus means for said direct CCIS data transmission to said memory means.

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**4,713,794**

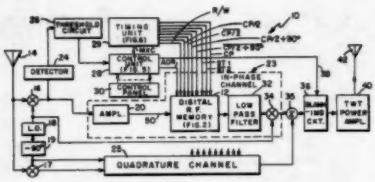
## DIGITAL MEMORY SYSTEM

**Roy E. Byington, Sudbury, and William M. Pease, Weston, both of Mass., assignors to Raytheon Company, Lexington, Mass.**

**Division of Ser. No. 972,594, Dec. 22, 1978, Pat. No. 4,318,182. This application Feb. 22, 1982, Ser. No. 350,932**

**Int. Cl.[4] G11C *27/00***

**U.S. Cl. 365—45** **9 Claims**




1. A method for storing digital samples representative of the level of an analog signal comprising the step of feeding the analog signal directly into a digital memory.

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**4,713,795**

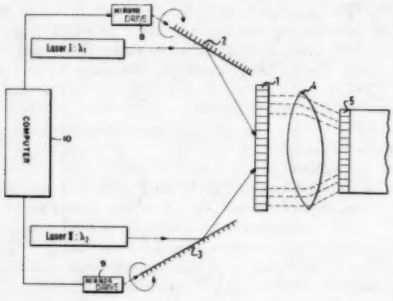
## OPTICAL SWITCH, ESPECIALLY FOR INFORMATION STORAGE AND RETRIEVAL

**Theo Woike, Cologne; Wolfgang Krasser, Jülich, and Siegfried Haussühl, Erftstadt, all of Fed. Rep. of Germany, assignors to Kernforschungsanlage Julich GmbH, Julich, Fed. Rep. of Germany**

**Filed Oct. 29, 1985, Ser. No. 792,655**

**Int. Cl.[4] G03C *1/72*; G11C *13/00*; G02F *1/01***

**U.S. Cl. 365—119** **24 Claims**




1. Optical switch capable of use for information storage, utilizing a medium capable of being converted from an original state to a metastable state by a radiative pumping by intensive light having a first wavelength ($\lambda_1$) and capable of being returned to said original state by intensive light having a second wavelength ($\lambda_2$), comprising a source of light of said first and second wavelengths, said storage medium, means for directing radiation of said first and second wavelengths for localized incidence on said medium and photodetector means for measuring radiation coming from said medium,

said medium being a nitroprusside single crystal of the formula $M_m[Fe(CN)_5NO]nH_2O$, wherein M is a metal capable of forming a nitroprusside salt, m is a valence-determined number determined by the valence of the metal M and the −2 valence of the nitroprusside group $[Fe(CN)_5NO]$ and n is an integer in range 0, 1, 2, 3 . . . 10,

said first light wavelength being in the range between 400 and 530 mn,

said second light wavelength being in the range from 600 to 680 nm, and

means being provided for cooling said single crystal at a temperature in the range between 140° K. and 210° K.

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**4,713,796**

## SEMICONDUCTOR INTEGRATED CIRCUIT

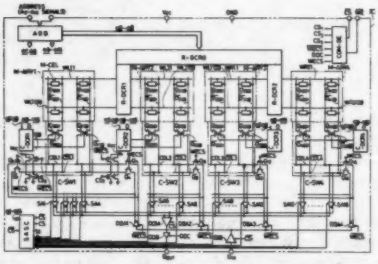
**Katsumi Ogiue; Yukio Suzuki, both of Hinode; Ikuro Masuda, Hitachi; Masanori Odaka, Kodaira, and Hideaki Uchida, Takasaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 13, 1985, Ser. No. 701,226**

**Claims priority, application Japan, Feb. 13, 1984, 59-22811**

**Int. Cl.[4] G11C *8/00***

**U.S. Cl. 365—189** **12 Claims**



1. A semiconductor integrated circuit comprising:

a plurality of memory cells;

an address circuit for selecting a specified memory cell from among said plurality of memory cells;

a signal circuit coupled to said memory cells and including means for respectively reading and writing information from and into said memory cells; and

a timing circuit coupled to said signal circuit for controlling operations of reading and writing information,

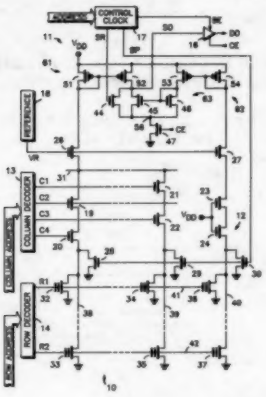
wherein said address circuit includes a principal portion constructed of a first CMOS circuit, and at least a first bipolar output transistor, which executes at least one of charge and discharge of a signal output line of at least one circuit in said address circuit, and wherein said signal circuit includes an input circuit which supplies a data signal to a data line coupled to at least said specified memory cell, said input circuit including a principal portion constructed of a second CMOS circuit and at least a second bipolar output transistor, which executes at least one of charge and discharge of said data line.

4,713,797

## CURRENT MIRROR SENSE AMPLIFIER FOR A NON-VOLATILE MEMORY

Bruce L. Morton, Round Rock, and Bruce E. Engles, Austin, both of Tex., assignors to Motorola Inc., Schaumburg, Ill.

Filed Nov. 25, 1985, Ser. No. 801,363
Int. Cl.[4] G11C 7/02
U.S. Cl. 365—208 17 Claims



1. A memory having an array of non-volatile memory cells which are in either a programmed or unprogrammed state, wherein the programmed state is characterized as having a first conductivity and the unprogrammed state is characterized as having the second conductivity, comprising:

decoder means for selecting a memory cell in response to an address and for coupling said selected memory cell to a common data line;

a reference memory cell which is unprogrammed and has the second conductivity;

reference current means, coupled to the reference memory cell, for establishing a reference current proportional to the second conductivity;

logic state current means, coupled to the data line, for establishing a logic state current proportional to the conductivity of the selected memory cell;

first current mirror slave means, coupled to the reference current means, for establishing a reference current limit between a first power supply terminal and an output node as a predetermined proportion of the reference current;

second current mirror slave means, coupled to the logic state current means, for establishing a control current limit between a second power supply terminal and the output node as a predetermined proportion of the logic state current, said control current limit being of a first magnitude if the logic state current is related to the first conductivity and being of a second magnitude if the logic state current is related to the second conductivity; and

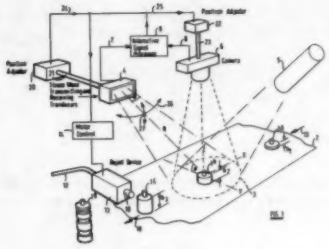
output means, coupled to the output node, for providing an output signal at a first logic state when the second current mirror slave establishes the control current limit at the first magnitude, and for providing the output signal at a second logic state when the second current mirror slave establishes the control current limit at the second magnitude.

4,713,798

## METHOD OF AND APPARATUS FOR PROVIDING OBJECT DATA BY MACHINE VISION

Leslie Kay, 82 Scarsborough Road, Christchurch, New Zealand

Filed Dec. 4, 1984, Ser. No. 678,215
Claims priority, application New Zealand, Dec. 9, 1983, 206,544; United Kingdom, Jun. 5, 1984, 8414283
Int. Cl.[4] G01S 9/66, 9/68
U.S. Cl. 367—96 22 Claims



1. A method for carrying out machine vision of an object in order to obtain data representative of selected parameters pertaining to the object, said method comprising: illuminating the object with at least two different kinds of energy supplied by two different sources so that each different kind of energy is reflected from the object; deriving, from each kind of energy reflected from the object, respective signals each containing data representative of at least one of the selected parameters, wherein, with respect to the at least one of the selected parameters, the signals derived from one kind of energy contain more accurate data than do the signals derived from the other kind of energy; processing the derived signals to obtain, from each kind of energy reflected from the object, a respective initial set of parameter-representative data elements, with at least one given data element representative of at least a given one of the selected parameters being absent from, deficient in, or requiring confirmation in one of the initial sets; selecting the at least one given data element from the other initial set in order to provide a combined set of data elements which constitute more accurate representations of the selected parameters than do either initial set; and applying the combined set of data elements to control performance of a given operation with respect to the object.

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4,713,799

## ULTRASONIC HORN WITH SIDELOBE SUPPRESSING CENTERPIECE

James J. Phelan, and Larry W. Ferguson, both of Bettendorf, Iowa, assignors to Deere & Company, Moline, Ill.

Continuation of Ser. No. 660,819, Oct. 15, 1984, abandoned.
This application Sep. 10, 1986, Ser. No. 906,596
Int. Cl.[4] H04R 1/02; G10K 11/00
U.S. Cl. 367—140 11 Claims

1. An ultrasonic horn assembly comprising:

a horn with a tapered horn bore extending from a smaller diameter throat to a larger diameter mouth;

an ultrasonic transducer mounted in the throat;

a centerpiece comprising a headpiece having a base and a top and a stem projecting from the base, the stem and base cooperating to define an annular shoulder surface surrounding the stem and facing towards the transducer, the shoulder surface being axially spaced apart from the trans-

ducer, the stem having a blind bore extending therein which opens towards the transducer; and

means for holding the centerpiece coaxially in the horn adjacent to and spaced apart from the transducer.

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**4,713,800**

**SEISMIC AIR GUN**

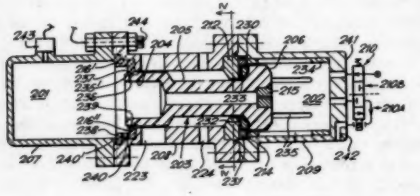
**Michael J. Russell, Frogham, United Kingdom, assignor to Geotech Engineering, Ringwood, United Kingdom**

**Filed Jul. 9, 1984, Ser. No. 628,453**

**Claims priority, application United Kingdom, Jul. 18, 1983, 8319390**

**Int. Cl.[4] G01V *1/02***

**U.S. Cl. 367—144** **19 Claims**



1. In a seismic air gun comprising: a body; a firing chamber within said body for containing pressurized gas to be released on firing said gun; an operating chamber within said body also for containing pressurized gas; a shuttle having a one end and an other end, said shuttle being movably accommodated in said body, and having a firing piston and an operating piston, said firing and operating pistons being inter-connected by a stem, said stem and said pistons having a throttled bore for communicating pressure from said one end of said shuttle to said other end; a firing seal at said firing chamber co-operating with said firing piston to close said firing chamber, when said shuttle is in a position for firing; an operating seal at said operating chamber co-operating with said operating piston to close said operating chamber when said shuttle is in said position for firing, said operating seal sealing a greater area of said operating piston to said body than the area of said firing piston sealed to said body for maintaining the pressure of pressurized gas in said operating chamber acting on said operating piston with a force greater than that of the pressure of the pressurized gas acting on said firing piston, a firing solenoid; a seat on said body for said firing solenoid; one passageway in said body from said operating chamber to said seat for leading pressurized gas to said firing solenoid, the improvement comprising:

another passageway leading directly from said seat to an ambient opening for firing of said gun by dumping pressurized gas from said operating chamber direct to ambient surroundings, said dumped pressurized gas passing direct to ambient surroundings via said one passageway, said firing solenoid and said other passageway; and further including a baffle within said body and surrounding said stem of said shuttle, said stem passing through said baffle with clearance to provide passage means for communicating ambient pressure form outside said body to sides of both said operating seal and at least a portion of said operating piston opposite from said operating chamber or at least for allowing escape to the ambient surroundings of any pressurized gas from said operating chamber present at said portion of the opposite side of said operating piston, whereby at least substantially ambient pressure acts on the said portion of said operating piston at least until said shuttle moves.

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**4,713,801**

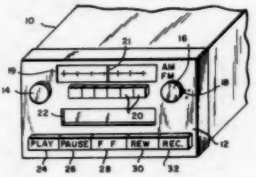
**RADIO-TAPE RECORDER FOR AUTOMOTIVE USE**

**Arthur D. Hale, 32 Portuguese Bend Rd., Rolling Hills, Calif. 90274**

**Filed Feb. 20, 1986, Ser. No. 831,318**

**Int. Cl.[4] G11B *31/00***

**U.S. Cl. 369—7** **7 Claims**




1. An in-dash mountable audio apparatus having a housing with a front face, said housing containing the following electrical systems;

(A) a radio reception system comprising an antenna, a radio tuner, and a radio signal preamplifier;

(B) a tape player and recorder system comprising a magnetic head, a motor drive, and a preamplifier;

(C) an audio output system comprising a variable resistor, a main amplifier, and at least one speaker; and,

(D) a power supply system comprising a power source, a main switch and a three-way switch having three electrical contact positions wherein: the first of said contact positions electrically engages the power supply only to the radio reception system and the audio output system; the second of said contact positions electrically engages the power supply only to the tape player and recorder system and the audio output system; and the third of said contact positions electrically engages the power supply simultaneously to the radio reception system, the tape player and recorder system, and the audio output system; and first, second and third manually-actuated controls accessible at said front face, said controls being separately and alternately operable to adjust said three-way switch respectively to one of the first, second and third of said contact positions.

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**4,713,802**

**DIGITAL SIGNAL REPRODUCING CIRCUIT**

**Hiroshi Kobata, and Tadashi Kojima, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Mar. 31, 1986, Ser. No. 846,208**

**Claims priority, application Japan, Mar. 30, 1985, 60-66891; Mar. 30, 1985, 60-66893; Mar. 30, 1985, 60-66890**

**Int. Cl.[4] G11B *5/76, 5/09***

**U.S. Cl. 369—59** **22 Claims**

1. A digital signal reproducing circuit comprising:

a wave-shaping circuit for converting high-frequency signals comprising digital signals modulated by a predetermined modulation system into binary signals:

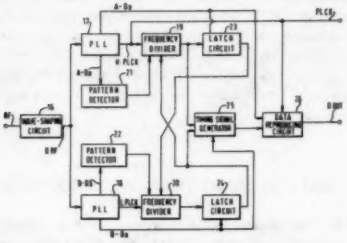
a phase locked loop circuit means for generating a first bit

synchronizing clock synchronized in phase to the leading edge of said binary signal and a leading edge detection data synchronized to said first bit synchronizing clock;

a first and a second frequency divider means for dividing said first and second bit synchronizing clocks, respectively;

a first and a second pattern detector means for detecting signal patterns specified in said binary signal, respectively;

a synchronization means for synchronizing the output of said first and second frequency divider means after the signal



patterns are detected by said first or second pattern detector;

a timing signal generation means for detecting the phase difference of each output of said first and second frequency divider means after synchronized by means of said synchronization means and generating timing signals on the basis of the phase difference and said second data signal; and

data reproducing circuit means for producing digital signals corrected by said timing signals and said first data signal.

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**4,713,803**

## BIDIRECTIONAL DIGITAL TRANSMISSION SYSTEM WITH ECHO-CANCELLATION

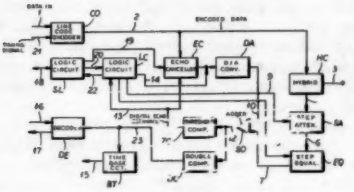
**Renato Ambrosio, S. Raffaele Cimena; Alberto Brosio, Borgaro Torinese; Alfredo Fausone, Ivrea, and Adler Tofanelli, Collegno, all of Italy, assignors to SIP—Societa Italiana per l'Esercizio Telefonico p.a., Turin, Italy**

**Filed May 8, 1986, Ser. No. 861,073**

**Claims priority, application Italy, May 14, 1985, 67441 A/85**

**Int. Cl.[4] H04L 5/14**

**U.S. Cl. 370—32.1** **5 Claims**



1. A system for bidirectional digital transmission with echo cancellation, comprising:

an encoder for encoding in line code a data signal received at an input of said encoder;

a hybrid connected to an output of said encoder for supplying to a line a data signal encoded by said encoder and for receiving from said line a data signal transmitted thereover;

a remotely-controllable attenuator connected to said hybrid;

a remotely-controllable equalizer connected to said attenuator;

an echo canceller connected to said output of said encoder for supplying an estimated-echo signal correlated with said encoded data signal;

a first threshold comparator connected to supply a digital signal to said echo canceller with which said estimated-echo signal is also correlated;

an adder having a first input connected to an output of said equalizer and an output connected to said first threshold comparator for summing a data signal received from said line by said hybrid and processed through said attenuator and said equalizer with said estimated-echo signal and applying to said first threshold comparator a signal outputted by said adder and whose zero crossings are detected by said first comparator to generate said digital signal;

a digital-to-analog converter connected to an output of said echo canceller for receiving said estimated-echo signal, said digital-to-analog converter being connected to a second input of said adder for applying said estimated-echo signal thereto;

a second, double-threshold comparator connected to said output of said adder for detecting positive and negative threshold crossings of the signal outputted by said adder;

a decoder connected to an output of said second comparator for decoding a signal outputted thereby and for delivering at an output of said decoder the data signal received from said line;

a time base circuit connected to said output of said second comparator for extracting synchronism information from the signal outputted by said second comparator;

a first logic circuit having an input receiving link time phase information, a first output connected to said echo canceller, and a second output; and

a second logic circuit connected to said second output of said first logic circuit and connected in turn to said digital-to-analog converter,

said first logic circuit being connected and arranged to alternately enable said echo canceller and said second logic circuit so that said digital-to-analog converter receives respectively said estimated-echo signal during a transmission and at an initial phase of establishment of a transmission link, a digital sequence which, converted into analog form by the digital-to-analog converter can be added in said adder to the data signal received from said line and resulting zero crossings are detected by said first comparator,

said second logic circuit being connected and arranged to receive information on zero crossings during said initial phase to generate respective control signals for said attenuator and said equalizer and applying said control signals to said attenuators and said equalizer for controlling transmission gain, said control signals being correlated with the amplitude of the data signal received from said line,

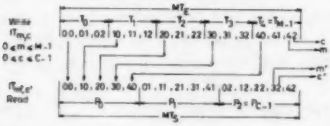
said second logic circuit being further connected to said first logic circuit to send thereto a signal representing effected gain adjustment, and

said first logic circuit is further connected and arranged upon receipt of said signal representing effected gain adjustment to re-enable said echo canceller after it has been disabled following a prior transmission, to inhibit said second logic circuit for a succeeding transmission and to communicate a signal representing availability of the system for the succeeding transmission.

## 4,713,804
## METHOD AND DEVICE FOR CONVERTING DIGITAL CHANNEL MULTIFRAMES INTO PACKET MULTIFRAMES

**Michel Servel, Le Rhu Servel, 22300 Lannion, and Alain Thomas, 2, rue du Bal Landreau, 44400 Reze-les-Nantes, both of France**

**Filed Jul. 3, 1986, Ser. No. 881,681**
**Claims priority, application France, Jul. 3, 1985, 85 10180**
**Int. Cl.[4] H04Q *11/04***
**U.S. Cl. 370—68** **8 Claims**



1. A method for converting an inputting multiframe into an outgoing multiframe,

said inputting multiframe having M frames, where M is an integer, each of said frames including words having a predetermined number of digits and assigned respectively to C time-division multiplexed digital channels, where C is an integer,

said outgoing multiframe having C packets assigned respectively to said channels, each packet including M successive words of said respective channel,

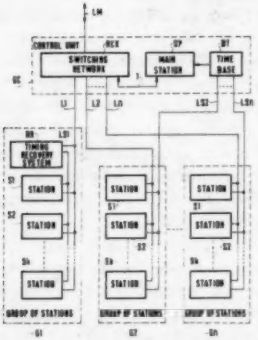
a word having a given rank and to be included in said outputting multiframe and a word having said given rank and included in said inputting multiframe being read and written consecutively in a same cell of a single memory, said memory having a capacity at least equal to MC word cells,

and said MC cells of said memory being addressed according to an address order rebecoming identical to itself after a cycle of N multiframe periods, where N is the smallest integer so that $C^N \equiv 1 \pmod{(MC-1)}$.

## 4,713,805
## METHOD AND DEVICE FOR SELECTING ONE STATION FROM A SET OF STATIONS DIALOGING WITH A MAIN STATION

**Bernard Hénaff, Ploubezre, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France**

**Filed Sep. 20, 1984, Ser. No. 652,390**
**Claims priority, application France, Sep. 27, 1983, 83 15294**
**Int. Cl.[4] H04J *3/02*; H04Q *19/00***
**U.S. Cl. 370—85** **5 Claims**

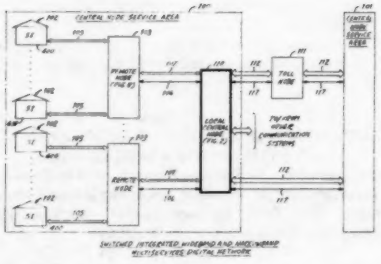


1. A method of selecting one station from a plurality of groups of stations dialoging with a main station over transmit multiplex links carrying messages sent by the stations and receive multiplex links carrying messages sent by the main station, said transmit and receive multiplex links each comprising at least one multiplex line having a time slot in a repetitive frame reserved for dialog, each of said groups being connected to the main station by a transmit multiplex link and a receive multiplex link, wherein the stations in each group receive a synchronization signal, each station in each group which has information to send in the reserved time slot of the transmit multiplexed link sends a request within the group for reservation of this reserved time slot after a time delay, whose length depends on an address of the station within the group, has elapsed since reception of the synchronization signal, the main station consults each group of stations in succession by sending a consultation message to all stations in the group, and the station in the consulted group which has reserved the reserved time slot sends its message as soon as it receives the consultation message.

## 4,713,806
## COMMUNICATION SYSTEM CONTROL ARRANGEMENT

**Lewis B. Oberlander, Buffalo Grove; David A. Spicer, Batavia, and Ralph V. Straubs, Naperville, all of Ill., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Mar. 14, 1986, Ser. No. 840,458**
**Int. Cl.[4] H04Q *11/04***
**U.S. Cl. 370—58** **17 Claims**



1. A control arrangement for a communication switching system having first and second communication networks configurable independently from each other separately to provide first and second communications, respectively, for terminal logical channels of the system, the system further including first and second network control means for configuring the first and the second networks, respectively, in response to receipt of requirements signals, the control arrangement comprising:

first program controlled means cooperative with both the first and the second network control means and operable in response to receipt of requirements signals and associated signals indicating the first communications for generating requirements signals for controlling the operation of the first network control means to configure the first network into at least one of (a) physical communication channels corresponding to the logical channels, and (b) physical communication paths betweenthe physical channels and corresponding to logical communication paths, and being further operable in response to receipt of requirements signals and associated signals indicating the second communications for generating requirements signals for controlling the operation of the second network control means to configure the second network into at least one of (a) physical communication channels corresponding to the logical channels, and (b) physical commu-

nication paths between the physical channels and corresponding to logical communication paths; and

second program controlled means independent in program from the first program controlled means and operable in response to receipt of call signals and associated signals indicating either one of the first and the second communications for any one of the logical channels for processing call information to generate, both independently of and for association with the first or the second communication indicating signals, the requirements signals for controlling the operation of the first program controlled means to establish the logical communication paths between the one logical channel and another at least one logical channel, independently of both the first and the second networks and the first and the second network control means.

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**4,713,807**

## INTELLIGENCE TRANSMISSION SYSTEM OF THE LOCAL AREA NETWORK TYPE

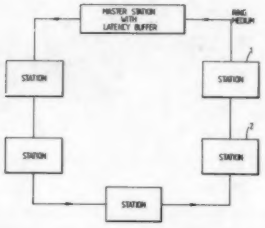
**Keith Caves, and Douglas E. Woodman, both of Sawbridgeworth, Great Britain, assignors to STC plc, London, England**

**Filed May 22, 1986, Ser. No. 866,433**

**Claims priority, application United Kingdom, May 24, 1985, 8513248**

**Int. Cl.[4] H04Q** *11/04;* **H04J** *3/00, 3/06*

**U.S. Cl. 370—94** **11 Claims**




1. An intelligence transmission system of the closed-loop type, in which a number of stations one of which acts as a Master Station are connected to the loop, in which the system handles both circuit-switched and packet-switched calls, in which in each TDM cycle a group of adjacent time slots is used as a framing group which occurs once per cycle of the system, which framing group includes a multi-bit group number (GN) portion which identifies a said slot or group of slots, in which on system start-up the value of the GN in the framing group is initially set to zero by the Master Station whereafter the value of the GN is incremented by the Master Station by unity on each system cycle, in which when the value of GN reaches the maximum number of slots available for circuit-switched connections, that value is reset to zero, whereafter the sequence recommences, in which only after the value of GN has reached its maximum for the first time a packet-switching token is emitted from the Master Station to incidate to the other stations on the loop that packet-switched connections can be handled, whereafter the Master Station repeats the token each time the Master Station receives the token and in which the maximum value of GN attained during a said sequence, as read by a said station on the loop indicates to that station how many times slots are currently available for circuit-switched connections.

**4,713,808**

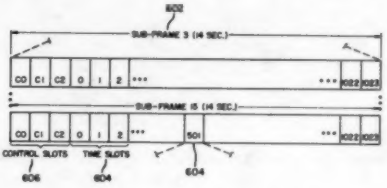
## WATCH PAGER SYSTEM AND COMMUNICATION PROTOCOL

**Garold B. Gaskill, Portland; Daniel J. Park; Robert G. Rullman, both of Beaverton; Donald T. Rose, Portland; Joseph F. Stiley, III; Lewis W. Barnum, both of Tigard, all of Oreg., and Don G. Hoff, Tiburon, Calif., assignors to A T & E Corporation, San Francisco, Calif.**

**Filed Nov. 27, 1985, Ser. No. 802,844**

**Int. Cl.[4] H04J** *3/24, 3/26*

**U.S. Cl. 370—94** **20 Claims**




1. A method of sending data as a data signal from a transmitter to a plurality of remote receivers on a common transmission channel, comprising:

time dividing the transmission channel into frames of a first duration, subdividing each frame into a plurality of subframes, and further subdividing each subframe into a plurality of time slots of a second duration, each frame repeating at periodic time intervals equal to said first duration;

numbering each subframe in the frame with a unique subframe number;

numbering a predetermined set of the time slots in each subframe, including numbering each time slot in said set with a unique number in a predetermined series of time slot numbers;

repeating said subframe and time slot numbers in each successive frame;

assigning each receiver a receiver address comprising one of the time slot numbers and one of the subframe numbers;

encoding the data for each receiver into a data packet of a predetermined length no greater than the duration of the time slots;

encoding in each packet a packet address including the number of a time slot during which the packet is to be transmitted;

transmitting a data signal comprising said packet during a time slot corresponding to the packet address; and

receiving the data signal and decoding the packet therefrom at a receiver that has a receiver address corresponding to the packet address.

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**4,713,809**

## TIME DIVISION MULTIPLE ACCESS RADIO COMMUNICATIONS SYSTEM

**Yasuhiro Mizota, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Jul. 21, 1986, Ser. No. 888,587**

**Claims priority, application Japan, Jul. 25, 1985, 60-165470**

**Int. Cl.[4] H04B** *3/36, 7/14*

**U.S. Cl. 370—97** **6 Claims**

1. A time division multiple access radio communication system comprising:

one base station;

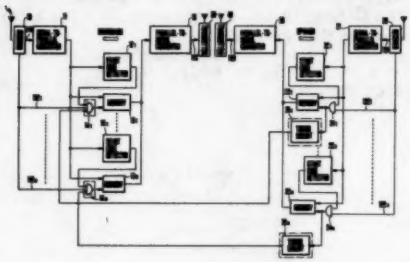
a plurality of repeater stations for sequentially repeating a radio signal received by and transmitted from said base station; and

a plurality of terminals for communicating the radio signal with said base station via said repeater stations,

each of said repeater stations including repeater means for

repeating the radio signal using a time slot assigned to each of said terminals, wherein

each of said repeater stations further comprises means for detecting a time slot in upward communication, and



means for activating said repeater means in association with only a time slot in downward communication corresponding to the detected time slot in upward communication.

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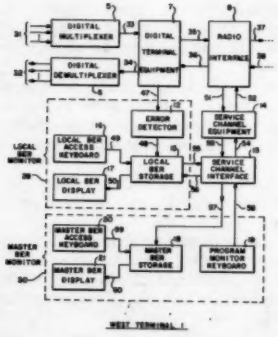
**4,713,810**

## DIAGNOSTIC TECHNIQUE FOR DETERMINING FAULT LOCATIONS WITHIN A DIGITAL TRANSMISSION SYSTEM

**Stanley Chum, Union City, Calif., assignor to GTE Sprint Communications Corp., Mountain View, Calif.**

**Filed Sep. 19, 1985, Ser. No. 777,803**
**Int. Cl.[4] H04L *1/00*; G06F *11/10***
**U.S. Cl. 371—4** **10 Claims**



1. An in-service method of detecting marginal and failed transmission equipment in a digital telecommunication system having at least one repeater and two end terminals, comprising the steps of:

monitoring the BER (bit error rate) of the digital line signals at predetermined repeater and termina! locations;

storing and truncating at each of said predetermined terminal and repeater locations of the monitored BER such that at least the most significant digit and the exponent are included;

encoding the stored data at each of said locations for transmission over said telecommunication system;

transmitting said encoded data from each of said monitored repeater and terminal locations to a predetermined terminal;

receiving at said predetermined terminal said encoded data from each of said monitored locations;

decoding each encoded data from each monitored location;

storing the decoded data representing the truncated version of the monitored BER therefrom;

periodically repeating at least once each of the above steps in sequence;

selectively comparing at least one stored truncated BER number monitored from a previous time with a stored truncated BER number monitored at a subsequent time from the same monitored location, said comparison providing an indication of marginal or failed equipment and of the fault location thereof.

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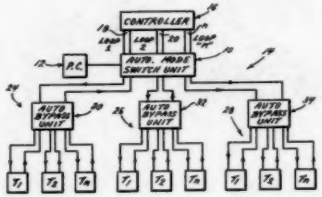
**4,713,811**

## AUTOMATIC MODE SWITCHING UNIT FOR A SERIAL COMMUNICATIONS DATA SYSTEM

**Ronald G. Frey, Emerson, N.J., assignor to Tytronix Corporation, Englewood, N.J.**

**Filed Nov. 7, 1985, Ser. No. 795,979**
**Int. Cl.[4] G06F *11/20***
**U.S. Cl. 371—9** **9 Claims**



6. An automatic switching unit for use in combination with a backup processor and a series communications system such as for retail store operations, and where the series communications system includes a controller having multiple serial ports, each port being connected in a series loop with a plurality of data terminals for registering sales transactions, there being a plurality of such series loops, said switching unit comprising:

a monitor for monitoring each of the series loops to detect a malfunction of any port;

a switching network connected between the controller, backup processor, and data terminals;

means for operating the switching network in response to the monitor detecting a malfunction of any port for automatically connecting the backup processor and all the data terminals in those loops associated with serial ports detected to be malfunctioning in a single series loop, and for automatically disconnecting the malfunctioning ports from the single series loop;

whereby, upon the monitor detecting that one or more ports is malfunctioning, the processor is automatically substituted for the malfunctioning ports, and all the data terminals that had been connected in one or more series loops with the malfunctioning ports are automatically connected in a single series loop with the processor; and

means for automatically wrapping each malfunctioning port in response to the monitor detecting its malfunction.

4,713,812

## METHOD AND APPARATUS FOR REPLACEMENT OF DATA AND OF A DATA MEMORY IN AN AUTOMOTIVE-TYPE ELECTRONIC CONTROL SYSTEM

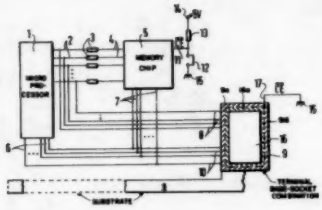
Herbert Arnold, Eberdingen; Michael Horbelt, Kleinglattbach, and Werner Jundt, Ludwigsburg, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Mar. 10, 1986, Ser. No. 838,176

Claims priority, application Fed. Rep. of Germany, May 25, 1985, 3518964

Int. Cl.[4] G06F *11/04*

U.S. Cl. 371—10 9 Claims



1. A method of supplying replacement data in an automotive data processing system having

a substrate (S);

a microprocessor (1) constructed in semiconductor hybrid technology, applied to the substrate;

a data memory chip (5) applied to the substrate;

a plurality of address lines (2, 4) and data lines (6, 7) connecting the microprocessor (1) and the memory chip (5); and

a terminal socket (9, 9*a*) also connected to the plurality of address lines (2, 4) and data lines (6, 7) leading to the microprocessor; comprising the steps of

recording said replacement data in an additional data memory (16);

applying a "disable" signal to an "enable-disable" input terminal (11) of the memory chip upon detection of malfunction, supply of erroneous data, or supply of inappropriate data from the memory chip (5); and

in one operation, simultaneously inserting the additional data memory (16) into the terminal socket (9, 9*a*) and applying an enabling potential to a terminal of the additional memory (16) to thereby place the additional data memory (16) in operative relation with the microprocessor (1).

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4,713,813

## LOGIC ANALYZER

Masayasu Sugimori, and Mitsuhiro Morishita, both of Tokyo, Japan, assignors to Ando Electric Co., Ltd., Tokyo, Japan

Filed Jun. 25, 1986, Ser. No. 878,101

Claims priority, application Japan, Jul. 3, 1985, 60-146190

Int. Cl.[4] G01R *31/28;* G09G *1/08*

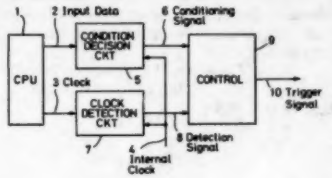
U.S. Cl. 371—15 2 Claims

1. A logic analyzer including at least a sampling system for sampling input data with a sampling clock signal, comprising:

a condition decision circuit having inputs supplied with said input data and an internal clock signal for producing a conditioning signal in dependence on said input data in synchronism with said internal clock signal;

a clock detection circuit for deciding whether said sampling clock signal makes appearance within a predetermined period of said internal clock signal to produce a signal representative of the result of said decision; and

a control circuit having inputs supplied with said conditioning signal and said signal representative of said result for producing a trigger signal corresponding to said conditioning signal in dependence on said signal representative of said result of decision.

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4,713,814

## STABILITY TESTING OF SEMICONDUCTOR MEMORIES

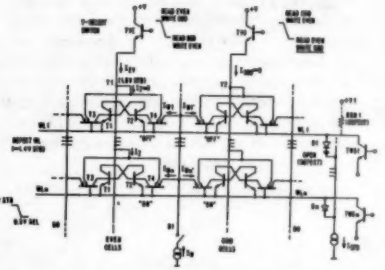
Georg Andrusch, Herrenberg; Joachim Baisch, Nufringen; Horst Barsuhn, Holzgerlingen, all of Fed. Rep. of Germany; Friedrich C. Wernicke, Fishkill, and Siegfried K. Wiedmann, Millwood, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 13, 1986, Ser. No. 839,315

Claims priority, application European Pat. Off., Mar. 29, 1985, 85103736.6

Int. Cl.[4] G06F *31/28*

U.S. Cl. 371—21 14 Claims



1. A method of testing a static semiconductor memory with inherent high data retention characteristics for defects in a standby supply system of said memory, said memory being provided typically in matrix form as an array of memory cells having bit positions arranged at the crosspoints of associated word and bit lines, said method comprising the steps of:

storing binary information in said cells in a given state,

energizing said word lines so as to place said word lines in a standby mode to maintain said word lines in an unselected state,

performing via associated bit lines with said cells in said given storage state during said standby mode a disturb write operation of said cells, and

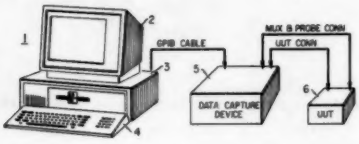
Checking subsequently for the memory cells subjected to the standby/disturb write operation the actual cell states,

whereby a change along a word line of the given storage state of one of sid cells is indicative of a defect-free standby supply system of the particular word line, whereas the presence of the given storage state of one of said cells along a word line under test is indicative of a failure in the standby supply system of that particular word line.

## 4,713,815
## AUTOMATIC FAULT LOCATION SYSTEM FOR ELECTRONIC DEVICES

**Dennis P. Bryan, Dunwoody, and John B. Rowe, Marietta, both of Ga., assignors to International Business Machines Corp., Armonk, N.Y.**

**Filed Mar. 12, 1986, Ser. No. 839,020**
**Int. Cl.[4] G01R *31/28***
**U.S. Cl. 371—29** **25 Claims**




1. In a fault locating system for locating faults in components and connections within an electronic device being tested, and including display means and input means for receiving diagnostic test procedure input, the method comprising:

displaying a plurality of test design input screens on the display means, said input screens being arranged to solicit author input in a sequential interactive manner to correspond to a series of testing steps to be accomplished, and to also solicit associated reference data values for selected electrical contact points within the electronic device, said reference data values being indicative of a condition of the electronic device from a designated starting point to each contact point; and

saving the author input solicited by the design input screens and received from the input means for subsequent recall to display the designed test process to an operator as a series of interactive step-by-step test procedure output screens, each of said test procedure output screens being arranged to solicit actual test data from a test probe arranged to be placed at various points in the electronic device being tested as directed by the test procedure output screens, and comparing said actual test data with the reference data values to provide an indicium representative of the result of such comparison.

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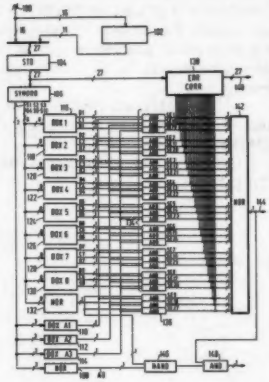
## 4,713,816
## THREE MODULE MEMORY SYSTEM CONSTRUCTED WITH SYMBOL-WIDE MEMORY CHIPS AND HAVING AN ERROR PROTECTION FEATURE, EACH SYMBOL CONSISTING OF 2I+1 BITS

**Willibrordus J. Van Gils, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Feb. 25, 1986, Ser. No. 833,644**
**Int. Cl.[4] G06F *11/10***
**U.S. Cl. 371—38** **8 Claims**

1. A three module memory system, each module having an equal number of memory symbol locations, each memory symbol location having an equal number of $2^i+1$ memory bit locations, a memory word thus containing $3(2^i+1)$ bits with $3 \leq i$, said memory system comprising input means for receiving user words of $2^{(i+1)}$ bits, encoding means fed by said input means for multiplying a user word received by a generator matrix (GO) to produce a memory word for storing in three corresponding memory symbol locations, wherein $(GO)=(P)\times(G)\times(Q)$, wherein (P) is an arbitrary regular matrix of dimensions $(2^{i+1})\times(2^{i+1})$, (Q) is an arbitrary permutation matrix of dimensions $\{3\times(2^i+1)\}\times\{3\times(2^i+1)\}$ for effecting bit-wise permutation within a code symbol and/or symbol-wise permutation within a code word, the choice for (P) and (Q) including identity matrices, and wherein G is a matrix of dimensions $(2^{i+1})$ rows and $3\times(2^i+1)$ columns for implementing a bitwise systematic error protection code having a minimum distance profile of (p, 2, 0) wherein p is at least equal to five.



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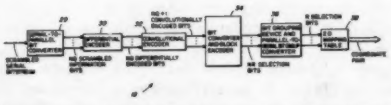
## 4,713,817
## MULTIDIMENSIONAL, CONVOLUTIONALLY CODED COMMUNICATION SYSTEMS

**Lee-Fang Wei, Westwood, Mass., assignor to Codex Corporation, Mansfield, Mass.**

**Filed Apr. 25, 1985, Ser. No. 727,398**
**Int. Cl.[4] G06F *11/10***
**U.S. Cl. 371—43** **82 Claims**



1. Apparatus for transmitting a stream of information bits by sending corresponding signals over a channel in a plurality of signaling slots, comprising

means for encoding the information bits that appear during a block of at least two said signaling slots by adding at least one redundant bit, to form a set of signal point selection bits for said block,

means for selecting, for each said set of signal point selection bits a multi-dimensional signal point drawn from a multi-dimensional constellation for said block, said multi-dimensional signal point selected for a particular said block being dependent on the multi-dimensional signal point selected for at least one other said block, said means for selecting being connected to be responsive to said means for encoding,

wherein said means for selecting establishes a correspondence between each possible combination of said signal point selection bits and the coordinates of a multi-dimensional signal point in said multi-dimensional constellation,

wherein said means for encoding and said means for selecting define a partitioning of said multi-dimensional constellation into a plurality of multi-dimensional subsets and determine the subset from which said multi-dimensional signal point is selected based upon at least one of said signal point selection bits, said multi-dimensional constellation being a concatenation of constituent constellations each of which has fewer dimensions than said multi-dimensional constellation and is partitioned into constituent subsets, each said multi-dimensional subset being based upon said constituent subsets but being other than a con-

catenation of constituent subsets of said constituent constellations, and

means for modulating at least one carrier for transmission over said channel in accordance with each selected said multi-dimensional signal point, said means for modulating being connected to be responsive to said means for selecting, and wherein

said constituent subsets in each said constituent constellation are grouped to form constituent families such that the minimum distance between constituent points within each said constituent subset is greater than the minimum distance between constituent points within each said constituent family, which is in turn greater than the minimum distance between constituent points within said constituent constellation,

said multi-dimensional constellation is partitioned into said multi-dimensional subsets based on said distances of said constituent families and subsets,

said multi-dimensional subsets are grouped to form multi-dimensional families also based on said distances, and

said constituent family comprises constituent subfamilies each of which comprises a plurality of said constituent subsets chosen such that the minimum distance between constituent points within each said constituent subfamily is greater than the minimum distance between constituent points within each said constituent family and is less than the minimum distance between constituent points within each said constituent subset, and said multi-dimensional constellation is partitioned into said multi-dimensional subsets also based on said distances of said constituent subfamilies.

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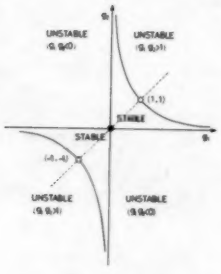
**4,713,818**

## OPTICAL BISTABLE DEVICE

**Chun-Sheu Lee, Torrance, Calif., assignor to Amada Engineering & Service Co., Inc., La Mirada, Calif.**

**Filed Dec. 5, 1984, Ser. No. 678,296**
**Int. Cl.[4] H01S *3/00***
**U.S. Cl. 372—8** **18 Claims**




1. An optical bistable device comprising:

(a) an optical resonator capable of resonating a laser beam therein when said resonator has a stable geometry and incapable of resonating the same therein when said resonator has an unstable geometry, wherein said resonator includes means for changing from a stable geometry to an unstable geometry according to a change in intensity of said laser beam and magnitude of input energy supplied to said optical resonator,

(b) a pair of mirrors,

(c) an internal refractive medium disposed between said optical resonator and pair of mirrors,

(d) a light emitting substance placed in said optical resonator for emitting simulated light upon receiving a supply of the input energy wherein said simulated light forms a laser beam when resonated by said optical resonator, and the intensity of said laser beam depends upon the magnitude of the input energy;

(e) means for suppying said resonator and said light emitting substance with the input energy; and

(d) means for increasing and decreasing the magnitude of the input energy over first and second prescribed values, wherein the first prescribed value of the input energy is a value at which the resonator changes from a stable geometry to an unstable geometry when sufficient input energy exists for laser action to occur under the stable geometry, and the second prescribed value of the input energy is a value at which the resonator changes from an unstable geometry to a stable geometry under the same condition mentioned above.

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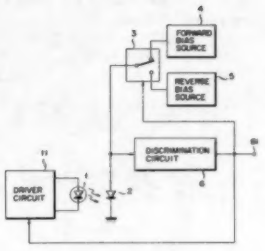
**4,713,819**

## SEMICONDUCTOR LASER DRIVER

**Shozi Yoshikawa, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed May 15, 1986, Ser. No. 863,698**
**Claims priority, application Japan, May 29, 1985, 60-115579**
**Int. Cl.[4] H01S *3/10***
**U.S. Cl. 372—9** **5 Claims**




1. A discriminating device for determining a malfunction in a photodiode when the photodiode is connected in circuit, comprising:

circuit means for applying an operating potential of a first polarity to operating terminals of a photodiode to be tested;

test means for applying a test potential to said operating terminals of the photodiode, said test potential being of opposite polarity with respect to said operating potential; and

means coupled to said circuit means and said test means for determining if said photodiode is malfunctioning according to a terminal voltage developed across the operating terminals of said photodiode when the test potential is applied, said determining means including means for producing a discrimination signal when said terminal voltage is within a predetermined range indicative of normal functioning of said photodiode.

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**4,713,820**

## THERMAL LENSING-COMPENSATED LANTHANUM BERYLLATE LASER

**Robert C. Morris, Ledgewood; Margaret N. Long, Landing; Timothy C. Chin, Piscataway, and Donald F. Heller, Bound Brook, all of N.J., assignors to Allied Corporation, Morris Township, N.J.**

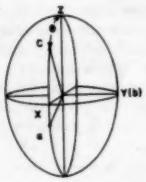
**Filed Aug. 2, 1985, Ser. No. 762,100**
**Int. Cl.[4] H01S *3/16*; C09K *11/06***
**U.S. Cl. 372—41** **11 Claims**

1. A lanthanum beryllate single crystal that

(a) is doped with an element selected from the group consisting of praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium and mixtures thereof; and

(b) has an elongated shape, in which the long direction is oriented at such an angle with respect to the crystallo-

graphic axes of the crystal that a plane polarized wave propagating in the crystal in the long direction will have




substantially zero temperature dependence of refractive index.

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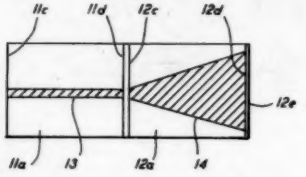
**4,713,821**

**SEMICONDUCTOR LASER AND OPTICAL AMPLIFIER**

**James N. Bradford, Arlington; Jimmy R. Ames, Middleburg, and Andrew H. Montroll, Reston, all of Va., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.**

**Filed Sep. 27, 1985, Ser. No. 780,879**
**Int. Cl.[4] H01S 3/19**
**U.S. Cl. 372—44** **16 Claims**




1. A semiconductor light generating device comprising:
laser diode means for generating a laser beam; and
a multi-layered planar semiconductor optical power amplifier optically coupled to said laser diode means having a planar active region with an input and output cross sectional area perpendicular to said active region, said input area being smaller than said output area.

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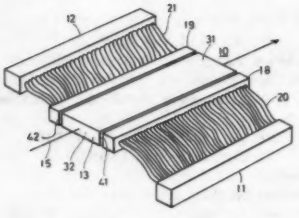
**4,713,822**

**LASER DEVICE**

**Chun-Sheu Lee, Torrance, Calif., assignor to Amada Engineering & Service Co., Inc., La Mirada, Calif.**

**Filed May 24, 1985, Ser. No. 737,485**
**Int. Cl.[4] H01S 3/09**
**U.S. Cl. 372—69** **6 Claims**




1. A comprising:
an optical resonator;
a slab-geometry solid state laser medium disposed within said optical resonator and having a longitudinal axis and a rectangular cross section transverse to said longitudinal axis, said rectangular cross section having a substantially constant height and width along said longitudinal axis, the width dimension being greater than the height dimension, the height of said rectangular cross section being defined by parallel top and bottom surfaces, the width of said rectangular cross section being defined by first and second side surfaces, and end faces of the medium along the longitudinal axis being fabricated at a Brewster angle with respect to the top or bottom surface so that the laser beam transmits in the medium along a zig-zag path bended by the top and bottom surfaces;
pumping means for optically exciting said slab-geometry laser medium through at least one of said first and second side surfaces;
wherein said pumping means is a laser-diode-pump module which comprises a laser-diode, a beam collimator which is disposed on a face of said side of slab-geometry laser medium, and an optical fiber bundle which guides the radiation beam emitted from said laser diode to said beam collimator.

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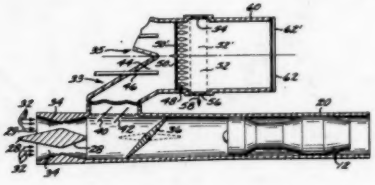
**4,713,823**

**PRE-COMBUSTION INTEGRATED RAM AIRBREATHING LASER**

**Eugene A. Smith, Vashon, Wash., assignor to Northrop Corporation, Hawthorne, Calif.**

**Filed Sep. 27, 1985, Ser. No. 781,441**
**Int. Cl.[4] H01S 3/09**
**U.S. Cl. 372—90** **16 Claims**



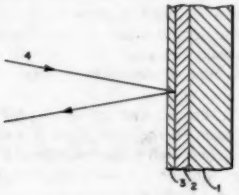

1. A Ram airbreathing gas dynamic laser provided on a mobile air vehicle having both a jet engine and a RAM type engine, comprising:
an air inlet duct directing air exterior the vehicle to the jet engine; the entrance to said inlet duct having a constricted inner diameter which preheats entering air when the mobile air vehicle is moving at high Mach speeds;
nozzle gate means positioned for diverting substantially all of said preheated air from said jet engine to a reservoir/-combustion chamber when said mobile air vehicle is operating on RAM engine power; said chamber having means for introducing fuel to said air and burning resulting air-fuel mixture;
a gas dynamic laser connected to the reservoir/combustion chamber, said laser including: means for aerodynamically expanding a burned air-fuel mixture supersonically, and an optical resonant cavity for stimulating lasing in said burned mixture; and
means for exhausting said burned mixture after passage through said gas dynamic laser.

4,713,824

## NOBLE-METAL OVERCOATED, FRONT-SURFACE SILVER REFLECTORS

Donald F. Heller, Bound Brook, N.J., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Feb. 11, 1983, Ser. No. 465,734
Int. Cl.[4] H01S 3/08
U.S. Cl. 372—99 8 Claims



1. In a reflector that includes a substrate having a reflective-silver coating on its front surface, the improvement comprising a partially-transparent gold overcoat on the coating.

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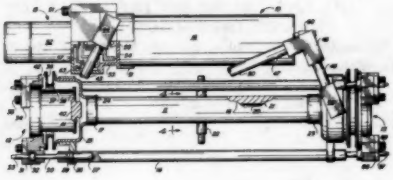
4,713,825

## GAS LASER AND METHOD OF MAKING A GAS LASER

Anthony P. Adsett, Orlando, Fla., assignor to Litton Systems, Inc., Orlando, Fla.

Filed Jul. 2, 1986, Ser. No. 881,097
Int. Cl.[4] H01S 3/08
U.S. Cl. 372—107 14 Claims



1. A gas laser apparatus comprising in combination:

a ceramic waveguide means having a bore extending therethrough and a pair of slots cut into the exterior of said bore for forming electrodes therein;

an electrode formed in each of said ceramic wave guide slots and having electrode costs extending from said electrodes;

an optical assembly having a mirror located on each end of said ceramic waveguide to each of said mirrors being attached to a metal ring in said optical assembly with a hardened fused glass frit material, said optical assembly metal ring is attached to a metal sleeve having a temperature expansion rate matched to the temperature expansion rate of a plurality of metal rods and said ceramic waveguide to expand said metal sleeve in a direction opposite from the expansion of said metal rods and ceramic waveguide; a gas ballast tank attached adjacent said ceramic waveguide, said gas ballast tank having a permanent magnet pump attached thereto for pumping the gas from said ballast tank through said ceramic waveguide, said magnetic pump having a permanent magnet coupling between an electric motor through a pump housing wall to permanent magnets attached to rotating vanes; and

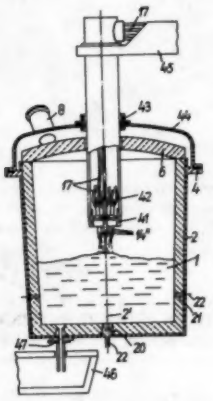
said plurality of metal rods connected between said optical assemblies, each of said plurality of metal rods having an adjustment screw on each end thereof movably connecting said optical assemblies to said rods for aligning the mirror of each optical assembly; whereby a laser has an adjustable mirror attached thereto with a high temperature glass frit seal.

4,713,826

## METHOD AND APPARATUS FOR HOLDING OR INCREASING THE TEMPERATURE IN A METAL MELT

Hans J. Bebber, Mülheim; Dieter Neuschütz, and Heinrich-Otto Rossner, both of Essen, all of Fed. Rep. of Germany, assignors to Fried. Krupp Gesellschaft mit beschränkter Haftung, Essen, Fed. Rep. of Germany

Division of Ser. No. 785,592, Oct. 8, 1985, Pat. No. 4,632,700.
This application Sep. 3, 1986, Ser. No. 903,303
Claims priority, application Fed. Rep. of Germany, Oct. 11, 1984, 3437333; Nov. 30, 1984, 3443740
Int. Cl.[4] H05B 7/00
U.S. Cl. 373—22 9 Claims



1. Apparatus for supplying thermal energy to a metal melt after having been discharged from a melting furnace, comprising: a receiving vessel for receiving the melt from the furnace; at least two water-cooled plasma torches each having a longitudinal axis and a central electrode from which a heating arc is generated during operation of the torches; means connected for supplying alternating current to said torches for operating said torches; a cover disposed above said vessel; means defining a passage through said cover for said electrodes; means associated with said passage for establishing a gas-tight seal between said electrodes and said cover; mount means supporting all of said torches; and lifting means supporting said mount means and operable for adjusting the height of said torches relative to said vessel, wherein said mount means comprise: a central pipe extending through, and movable relative to, said passage; an insert support at the lower end of said pipe and carrying said torches; and means for supplying cooling water to the interior of said central pipe and said insert.

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4,713,827

## TERMINATOR FOR A CMOS TRANSCEIVER DEVICE

Donald K. Lauffer, Poway; Gregory H. Milby; Paul M. Rostek, both of San Diego, and Ikuo J. Sanwo, San Marcos, all of Calif., assignors to NCR Corporation, Dayton, Ohio

Filed Nov. 10, 1986, Ser. No. 929,122
Int. Cl.[4] H04L 25/12
U.S. Cl. 375—7 6 Claims

1. A terminator for a transceiver device transmitting data signals to and receiving data signals from a second transceiver device over a transmission line therebetween, said terminator comprising:

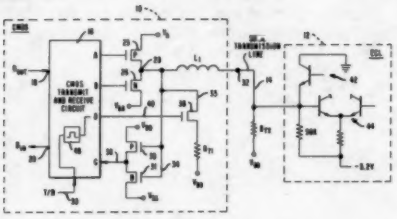
a transmitter connected to the transmission line for transmitting data signals to the second transceiver device;

a receiver connected to the transmission line for receiving data signals from the second transceiver device;

a termination resistor connected to the transmission line for

improving the transmission characteristics of the transmission line;

switch means between said termination resistor and the transmission line, said switch means having a first closed state wherein said transmission resistor is connected to the transmission line, and a second opened state wherein said



termination resistor is not connected to the transmission line; and

control means in said switch means for placing said switch means in said first closed state for a set portion of the time that said receiver is receiving data from the second transceiver device.

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**4,713,828**

## DATA REDUCTION CIRCUIT

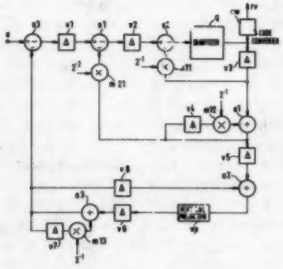
**Soenke Mehrgardt, March, Fed. Rep. of Germany, assignor to Deutsche ITT Industries GmbH, Freiburg, Fed. Rep. of Germany**

**Filed Apr. 3, 1986, Ser. No. 847,646**

**Claims priority, application European Pat. Off., Apr. 3, 1985, 85104051.9**

**Int. Cl.[4] H04B *14/06***

**U.S. Cl. 375—30** **2 Claims**



1. Data reduction circuit for reducing the number of bits of digital video signals with a differential pulse code modulator comprising:

a vertical predictor;

a quantizer; and

a code converter for converting the output data of said quantizer into an output signal with the reduced number of bits; and

the input data is fed to a first delay element, said input data changing at the rate of a clock signal;

said first delay element having its output coupled to the minuend input of a first subtracter;

the output of said first subtracter being connected via a second delay element to the minuend input of a second subtracter having its output coupled to the input of the quantizer;

the output of said quantizer being connected to the input of a third delay element having an output coupled to the first input of a first adder and through a first $2^{-1}$ multiplier to a subtrahend input of said second subtracter;

the delay produced by each of said first, second and third delay elements being equal to the period of said clock signal;

said first delay element is preceded by the minuend-input-output path of a third subtracter;

the output of said first adder is coupled through a fourth $2^{-2}$ multiplier to the subtrahend input of said first subtracter, through a fourth delay element and a second $2^{-1}$ multiplier to the second input of said first adder, and through a fifth delay element to the first input of a second adder having its input connected to the input of said vertical predictor;

the output of said vertical predictor is coupled through a sixth delay element to the first input of a third adder whose output is connected to the subtrahend input of said third subtracter, through a seventh delay element and a third $2^{-1}$ multiplier to the second input of said third adder (a3), and through an eighth delay element to the second input of said second adder (a2); and

the delay of each of said fourth, fifth, sixth, and seventh delay elements is equal to that of said first delay element, while the delay of said eighth delay element is four times that of said first delay element.

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**4,713,829**

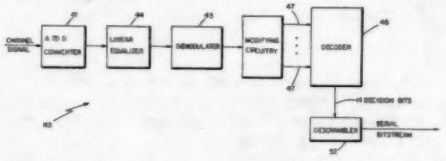
## CODED MODULATION SYSTEM WITH A SIMPLIFIED DECODER CAPABLE OF REDUCING THE EFFECTS OF CHANNEL DISTORTION

**Vedat M. Eyuboglu, Boston, Mass., assignor to Codex Corporation, Mansfield, Mass.**

**Filed Jun. 19, 1985, Ser. No. 746,538**

**Int. Cl.[4] H04L *27/00***

**U.S. Cl. 375—37** **30 Claims**



1. A receiver for deciding which signal points were sent from a transmitter based on corresponding noise affected signals received via a distorting channel, said noise affected signals carrying information about a particular sequence of encoding states occupied in a succession of time intervals by a finite state device in said transmitter having a finite number of possible said encoding states, said receiver comprising

modifying circuitry for generating a plurality of different modified versions of each said received signal, and

a decoder having a finite number of possible decoder states based on said possible encoding states, and for deciding which signal points were sent based on said decoder estimating a particular time sequence of said decoder states corresponding to said particular sequence of encoding states, by storing a number of path histories of previous signal points in said decoder, and using said modified versions to extend said path histories to later time intervals,

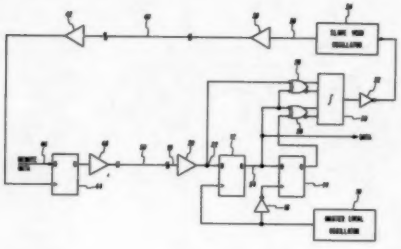
said different modified versions of each said received signal numbering fewer than said number of said stored path histories.

**4,713,830**

## CONTINUOUSLY VARIABLE SYNCHRONIZER APPARATUS

**Mark A. McDonald, Garland, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Jun. 30, 1986, Ser. No. 880,470**
**Int. Cl.[4] H04L *7/00*; H03D *3/24***
**U.S. Cl. 375—109** **5 Claims**



2. The method of compensating for variable transmission line time delays in received data comprising the steps of:

receiving data from a remote location;

generating a local master clock signal;

detecting the phase difference between said local master clock signal and received data;

adjusting the frequency of a clock output of a local slave oscillator in accordance with the detected phase difference; and

supplying the clock output of the local slave oscillator to the remote location for use in correctly timing the output of data from said remote location.

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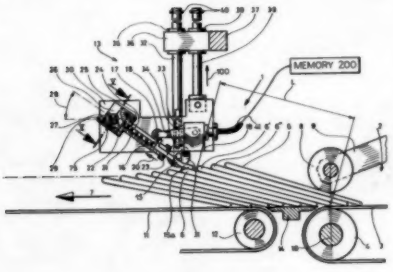
**4,713,831**

## COUNTING METHOD AND DEVICE

**Jean-Bernard Morisod, Crissier, Switzerland, assignor to Bobst SA, Switzerland**

**Filed Oct. 2, 1985, Ser. No. 783,175**
**Claims priority, application Switzerland, Oct. 12, 1984, 04893/84**
**Int. Cl.[4] G06M *7/06***
**U.S. Cl. 377—8** **9 Claims**




1. In a device for counting the number of objects in a flow of objects being moved past a given point, said device including sensor means for engaging the objects in succession and activating first means to create a pulse for each object, which pulse is processed in a memory with the improvements comprising the device including a plate and a conveyor with a belt for moving the flow of objects along a plane beneath the sensing means, said sensor means having a portion engaging the leading edge of each object in succession with movement of the engaged object in the direction of the flow causing the portion to move and activate the first means to create the pulse, and means for shifting the first means and sensor means to lift the portion out of engagement with the edge after creating the pulse to enable resetting the first means for forming the pulse and to engage an edge of the next following object of the flow, said means for shifting including means mounting the plate for movement along a path extending substantially perpendicular to the plane of the belt, said means for mounting including a pair of rods secured to the plate, said rods being mounted in a bearing arrangement on a frame of the conveyor for movement along the axis of the rods, one of said rods supporting a roller riding on the flow of objects so that as the roller moves over a leading edge of each object, the plate and rods are shifted perpendicularly away from the flow.

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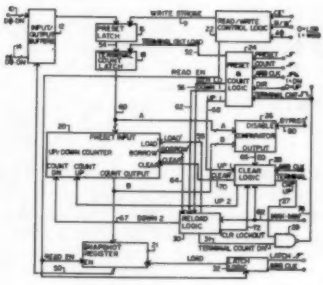
**4,713,832**

## PROGRAMMABLE DIVIDER UP/DOWN COUNTER WITH ANTI-ALIASING FEATURE AND ASYNCHRONOUS READ/WRITE

**John Hutson, Palo Alto, Calif., assignor to Ampex Corporation, Redwood City, Calif.**

**Filed Apr. 11, 1986, Ser. No. 851,063**
**Int. Cl.[4] H03K *23/66, 21/40***
**U.S. Cl. 377—45** **25 Claims**



1. A bidirectional counter with programmable terminal count capability comprising:

an up/down counter for counting up or down in response to count up and count down signals applied respectively to count up or count down inputs;

first means for storing a current terminal count;

second means coupled to said first means and to said up/down counter for comparing the current terminal count to the current count in said up/down counter and for clearing the up/down counter to zero when the two numbers are equal and the next count up signal is received;

third means for causing the current terminal count to be loaded into said up/down counter as the current count in said up/down counter after the current count in said up/down counter becomes equal to zero and the next down count signal is received.

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**4,713,833**

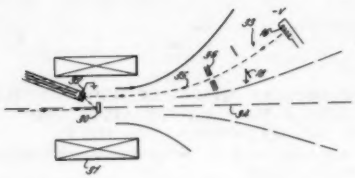
## X-RAY SOURCE APPARATUS

**David W. Turner; Andrew J. Dixon; Karl A. Gehring, all of Oxford, and Michael Keenlyside, Oxfordshire, all of United Kingdom, assignors to Kevex Corporation, Foster City, Calif.**

**PCT No. PCT/GB83/00157, § 371 Date Feb. 17, 1984, § 102(e) Date Feb. 17, 1984, PCT Pub. No. WO84/00079, PCT Pub. Date Jan. 5, 1984**
**Continuation of Ser. No. 588,875, Feb. 17, 1984. This PCT application Jun. 16, 1983, Ser. No. 797,197**
**Claims priority, application United Kingdom, Jun. 17, 1982, 8217609**
**Int. Cl.[4] G21G *4/00*; H01J *35/00, 35/30***
**U.S. Cl. 378—119** **8 Claims**

1. An X-ray source apparatus comprising, in an evacuated

chamber, an X-ray target of a selected material which emits X-rays when bombarded with electrons of at least a predetermined energy; a source of electrons; means for accelerating electrons from said source to at least the predetermined energy; means for generating a magnetic field with curved lines of magnetic flux interlinking said target and said electron source and with the magnetic field having sufficient strength over the whole of the interlinking magnetic flux lines between said target and said electron source such that electrons of the energies of those accelerated from said source with compo-



nents at angles to the magnetic field are constrained by the field to execute helical paths adjacent said source and to travel generally in the direction of the lines of flux, said target being sized and positioned to intercept substantially all of those lines of flux that intercept said electron source so that substantially all the electrons from said source bombard said target to cause said target to emit X-rays; and aperture means blocking straight line paths between said source and said target but permitting passage of substantially all the electrons travelling along the flux lines from said source to said target.

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**4,713,834**

## MULTIPROCESSOR COMPUTING SYSTEM FEATURING SHARED GLOBAL CONTROL

**David J. Brahm, Naperville; James M. Grinn, Warrenville; Edward L. Hepler, and Edward P. Schan, Jr., both of Woodridge, all of Ill., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Division of Ser. No. 430,681, Sep. 30, 1982, Pat. No. 4,626,634.**
**This application Jun. 20, 1986, Ser. No. 876,407**
**Int. Cl.[4] H04M *3/28***
**U.S. Cl. 379—28** **17 Claims**

1. In a data processing, communication, or telephone system, a multiprocessor comprising:

a plurality of identifiable stations each having a first plurality and a second plurality of addresses associated therewith, the addresses of the second plurality of addresses being common to all stations, and the addresses of the first plurality of addresses of each station being exclusive to that station and including addresses of the second plurality of addresses each combined with an address portion identifying the associated station;

each station including a plurality of addressable elements, each element having associated therewith a second address from the second plurality of addresses and a first address from the first plurality of addresses such that the first address is the second address combined with the address portion identifying the station;

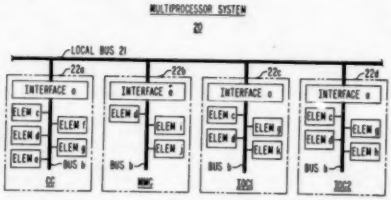
the plurality of elements of each station including a plurality of elements that are common among stations in that for each common element there is another element in at least one other station that is a functional counterpart of the common element, each common element and its counterpart elements having the same second address associated with them;

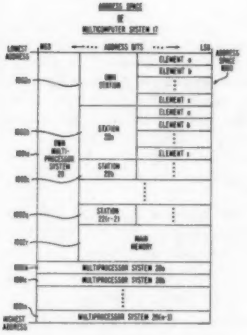
a system communication bus interconnecting the plurality of stations;

each station including a station communication bus interconnecting the plurality of elements of the associated station;

at least two of the plurality of stations each having processor means connected to the station bus, the processor means for generating the first address of an element of another station on the station bus to access the addressed element of the other station, and further for generating the second address of an element of the associated station on the station bus to access the addressed element of the associated station;

each of the at least two stations having first interface means for connecting the system bus with the station bus in response to detecting an address from a first plurality of



addresses on the station bus, to transfer the address to the system bus; and

each station having second interface means for connecting the system bus with the station bus in response to detecting an address from the first plurality of addresses of the associated station on the system bus, to transfer the second address portion of the first address from the system bus to the station bus.

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**4,713,835**

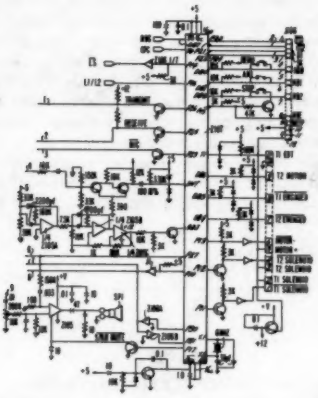
## TELEPHONE ANSWERING MACHINE WITH AUTOMATIC RECORDING AND VISUAL DISPLAY OF TIME AND DATA

**Raymond G. Bond, Long Beach, and Gerald L. Mock, Corona, both of Calif., assignors to Fortel Corporation, Compton, Calif.**

**Filed May 9, 1986, Ser. No. 861,355**
**Int. Cl.[4] H04M *1/65***
**U.S. Cl. 379—79** **8 Claims**

1. A telephone answering machine which includes a mechanism in which incoming messages received over a telephone line are recorded in sequence on a memory member, the combination of: ring detect circuitry connected to the telephone line and responsive to ring signals received over the telephone line for producing a control signal; a microcomputer connected to said ring detect circuitry and responsive to said control signal for delivering an outgoing message, for causing incoming messages received over the telephone line to be recorded on the memory member and for causing related data to be stored in said microcomputer; playback circuitry connecting said microcomputer to said mechanism for causing the mechanism to play back the messages and data recorded on the

memory member; first control circuitry connected to said microcomputer for controlling the mechanism at the termination of each message received over the telephone line to cause the memory member to move back to a blank portion adjacent to the beginning of the last incoming message recorded on said memory member; circuitry connecting said microcomputer to said memory member to cause the data stored in the microcomputer to be recorded on said memory member in the



corresponding blank portion and for subsequently introducing the data recorded on said memory member to said microcomputer during playback of the messages recorded on said memory member; a visual display device; and further circuitry connecting said microcomputer to said visual display device for causing the data recorded on the memory member to be displayed by said display device during playback of the messages recorded on said memory member.

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**4,713,836**

**TELEPHONE SET STRUCTURE HAVING A MEMBER CAPABLE OF BEING INSERTED IN INVERTIBLE POSITION**

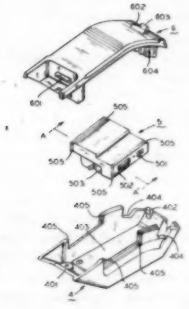
**Takeshi Suzuki, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Jul. 3, 1985, Ser. No. 752,142**

**Claims priority, application Japan, Jul. 6, 1984, 59-101428[U]; Sep. 17, 1984, 59-140609[U]**

**Int. Cl.[4] H04M *1/23*; H04Q *7/00***

**U.S. Cl. 379—58** **12 Claims**



1. A telephone set comprising a handset mounted on a base, manual actuatable control modular means separately mounted to be installed in said base in either of two positions, one of said two positions exposing said manual actuatable control modular means on a right-hand side of said base and the other of said two positions exposing said manual actuatable control modular means on the left-hand side of said base, and means for mounting said base in either of two modes, one of said modes being a vehicle mount and the other of said modes being a portable mount.

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**4,713,837**

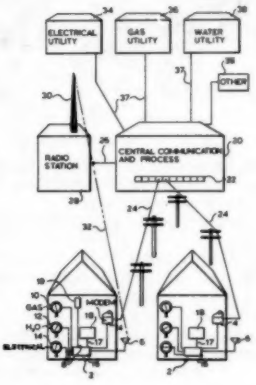
**COMMUNICATION NETWORK**

**Alastair Gordon, 61 Dalewood Road, Toronto, Ontario, Canada M4P 2N4**

**Filed Dec. 24, 1985, Ser. No. 813,229**

**Int. Cl.[4] H04M *11/00***

**U.S. Cl. 379—93** **1 Claim**




1. A communication system for transmitting information originating from a receiving and transmitting station and destined for another receiving and transmitting station over telecommunication channels comprising:

a plurality of receiving and transmitting stations, each having a unique address code, means for receiving a broadcast signal which can include address codes, means for determining whether the particular address code is contained within a received broadcast signal, an automatic telephone dialer, means for actuating said automatic dialer when the address code is determined to be contained in said received broadcast signal, and a telephone line associated with said telephone dialer,

a central processing facility including means to receive and automatically answer incoming telephone communications and store information including address codes transmitted during such communications, means to create an instructing signal containing particular address codes and incorporate such address codes in a broadcast signal, and

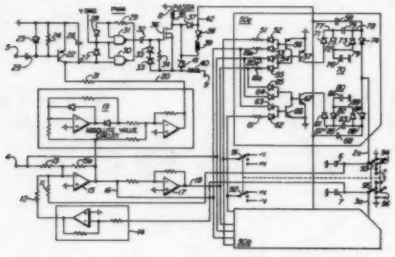
a broadcast station which transmits such address codes to receiving and transmitting stations,

wherein information identifying the destined receiving and transmitting station is transmitted from an originating station to said central processing facility which incorporates the address code of the destined receiving and transmitting station in a broadcast signal which when received by said destined receiving and transmitting station determines the particular address code is included in the broadcast signal by said determining means and actuates said automatic telephone dialer completing a telephone communication with said central processing facility which upon identification of said particular receiving means transmits to said destined receiving and transmitting station the information.

## 4,713,838
## AMPLIFIER WITH DOUBLE RAIL OUTPUT

**Stanley D. Rosenbaum, and Calvin Plett, both of Ottawa, Canada, assignors to Northern Telecom Limited, Montreal, Canada**

**Division of Ser. No. 878,729, Jun. 26, 1986, Pat. No. 4,691,271. This application May 20, 1987, Ser. No. 51,802**
**Claims priority, application Canada, Oct. 28, 1985, 493989**
**Int. Cl.[4] H04M** *3/02*
**U.S. Cl. 379—252** **8 Claims**



1. An amplifier for amplifying a reference signal to provide therefrom at least one of an amplified replica of the reference signal and its complement comprising:

a reference signal terminal for application of the reference signal thereto;

amplification means including first and second outputs for supplying at least one of the amplified replica and its complement respectively, first and second power terminals for connection to a d.c. power source, and an input;

a network including a first resistor being connected between the first output and the input, a second resistor being connected between the second output and the input, and a third resistor being connected between the reference signal terminal and the input; and

a unity gain inverter being connected in series with one of the first and second outputs and a respective one of the first and second resistors.

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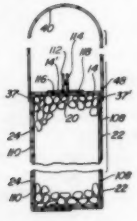
## 4,713,839
## RESEALABLE REUSABLE FLEXIBLE PLASTIC BAG WITH LOOP HANDLE

**Harry R. Peppiatt, Doylestown, Pa., assignor to Paramount Packaging Corp., Chalfont, Pa.**

**Continuation-in-part of Ser. No. 388,381, Jun. 14, 1982, Pat. No. 4,573,203. This application Jan. 21, 1986, Ser. No. 821,561**
**Int. Cl.[4] B65D** *33/10, 33/16*
**U.S. Cl. 383—29** **18 Claims**



1. A resealable reusable flexible plastic bag comprising an outer unitary piece of flexible plastic material including generally rectangular front and rear plastic panels and a gusset connecting said panels at a first end portion of the bag, an inner unitary piece of flexible plastic material including generally rectangular front and rear panels and a gusset connecting said last-mentioned panels at said first end portion of the bag, the ends of said inner and outer unitary pieces of flexible plastic material opposite said first end of the bag being open to facilitate introducing goods into the bag, the side edges of said gussets and said panels being connected together in a manner so that the bag when filled can approximate the shape of a hexahedron with said gusset of said outer piece of flexible plastic material being flattened and closing said first end portion of the bag, a handle defined by a loop of flexible plastic material having ends and being secured at each of its ends to a separate one of said panels of said outer piece of flexible plastic material adjacent said gusset of said outer piece of flexible plastic material, at least a portion of each of said gussets being frangible so as to facilitate access to the goods in the bag and thereafter permit reuse of the bag, and closure means having first and second mating portions separably connectable to each other and connected to said gusset of said outer piece of flexible plastic material so as to prevent access to the goods in the bag when said mating portions are connected together and for facilitating access to the goods in the bag when said mating portions are separated.

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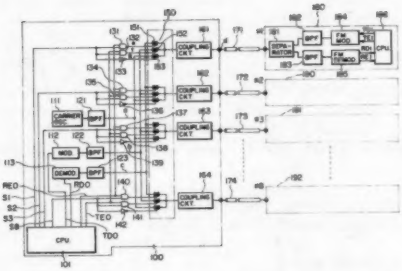
## 4,713,840
## DATA COMMUNICATION SYSTEM

**Yonosuke Hasegawa, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Jun. 25, 1985, Ser. No. 748,638**
**Claims priority, application Japan, Jun. 25, 1984, 59-131278**
**Int. Cl.[4] H04H** *1/04*
**U.S. Cl. 455—2** **3 Claims**



1. A data communications system for performing data communications between a central control device and a plurality of terminal units, comprising:

a plurality of transmission paths coupling said central control device to a like numbered plurality of said terminal units;

means for applying a transmission carrier to ones of said transmission paths when said central control device neither transmits information to nor receives information from terminal units associated with said ones of said transmission paths;

means for suspending application of said carrier to a selected transmission path when communications are to be initiated between said central control device and the terminal unit associated with said selected path; and

at each terminal unit, means for detecting the suspension of reception of said carrier, said suspension constituting a transmission request directed to said terminal unit, and means for performing an up-data transmission to said central control device in response to a detected transmission request.

**4,713,841**

## SYNCHRONOUS, ASYNCHRONOUS, DATA RATE TRANSPARENT FIBER OPTIC COMMUNICATIONS LINK

**David R. Porter, Roanoke; James H. Bowen, Salem, and John M. Holland, Shawsville, all of Va., assignors to ITT Electro Optical Products, a division of ITT Corporation, Roanoke, Va.**

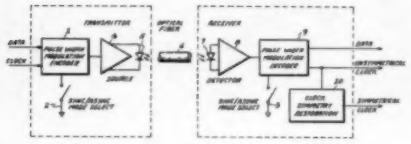
**Filed Jun. 3, 1985, Ser. No. 740,151**
**Int. Cl.[4] H04B** *9/00*
**U.S. Cl. 455—608** **9 Claims**

1. A circuit for receiving pulse width modulated data signals in an optical fiber communications system comprising:

means for amplifying a pulse width modulated signal;

means for comparing the amplified pulse width modulated signal with a reference quantity and

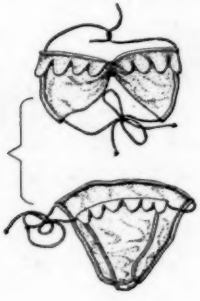
means connected to said pulse amplifying means for limiting the peak value of the amplified pulse width modulated signal, said limiting means including means connected to



an output of said comparing means for adjusting the duty cycle of the amplified pulse width modulated signal.

293,155
CONFECTION ON A STICK
Sidney Barish, Richmond Hill, Canada, assignor to Dickie Dee Ice Cream (Canada) Ltd., Richmond Hill, Canada
Filed Feb. 21, 1985, Ser. No. 703,878
Claims priority, application Canada, Nov. 14, 1984, 14-11-84-3
Term of patent 14 years
U.S. Cl. D1—104

293,156
BATHING SUIT OR THE LIKE
Elena M. Dunnagan, Wilmington, N.C.
Filed Jun. 28, 1984, Ser. No. 625,555
Term of patent 14 years
U.S. Cl. D2—41



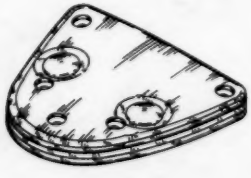
293,157
SHOE
Scott A. Williams, 2537 Michaelangelo Dr., Stockton, Calif. 95207
Filed Sep. 17, 1985, Ser. No. 776,926
Term of patent 14 years
U.S. Cl. D2—283

293,158
SPORT SHOE
Robert R. Campbell, New York, N.Y., assignor to BBC International Ltd., New York, N.Y.
Filed Jul. 12, 1984, Ser. No. 629,999
Term of patent 14 years
U.S. Cl. D2—309

293,159
SHOE
Guillaume Sacre, West Linn, Oreg., assignor to Danner Shoe Manufacturing Co., Portland, Oreg.
Filed Aug. 26, 1985, Ser. No. 769,354
Term of patent 14 years
U.S. Cl. D2—313

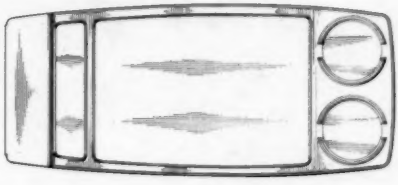
293,160
ICE CREEPER
Loren L. Le Droit, 613 E. 12th, North Platte, Nebr. 69101
Filed Jun. 24, 1985, Ser. No. 748,115
Term of patent 14 years
U.S. Cl. D2—317

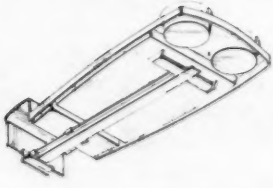
293,161
CLOGGING DANCE TAP DEVICE
Walter T. Stevens, Jr., 105 Fellowship Rd., Moorestown, N.J. 08057
Filed Jun. 24, 1985, Ser. No. 748,174
Term of patent 14 years
U.S. Cl. D2—317



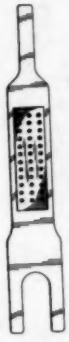
293,162
CARRIER ATTACHMENT FOR AN AUTOMOBILE SEAT OR THE LIKE
Bruce Carmichael, 750 Madison, Lebanon, Mo. 65536
Filed Nov. 9, 1984, Ser. No. 669,999
Term of patent 14 years
U.S. Cl. D3—40

293,163
CAR TRAY
Charles S. Roth, 731 Arneill Rd., Camarillo, Calif. 93010
Filed May 9, 1986, Ser. No. 862,407
Term of patent 14 years
U.S. Cl. D3—40

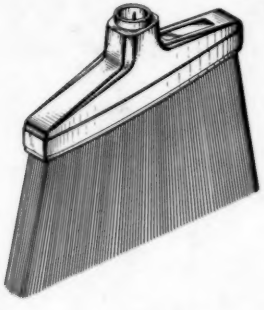




293,164
CLEAT CLEANER
Alan D. Shearer, 185 Katy La., Englewood, Ohio 45322
Filed Mar. 18, 1985, Ser. No. 713,036
Term of patent 14 years
U.S. Cl. D4—118

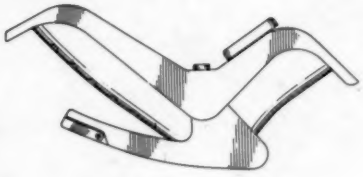


293,165
ANGLED BROOM
Robert W. Machacek, Villa Park, Ill., assignor to The Drackett Company, Cincinnati, Ohio
Filed Feb. 13, 1986, Ser. No. 833,451
Term of patent 14 years
U.S. Cl. D4—135



293,166
WIRE WHEEL BRUSH
William G. Caswell, 2720 Donna Dr., Perry, Iowa 50220
Filed Apr. 19, 1985, Ser. No. 725,110
Term of patent 14 years
U.S. Cl. D4—137

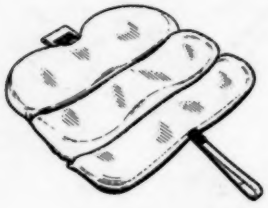
293,167
INFANT SEAT
Merry S. Riehm, E. Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Aug. 2, 1985, Ser. No. 762,128
Term of patent 14 years
U.S. Cl. D6—333



293,168
CHAIR
Rose Tarlow, 405 S. Bedford Dr., Beverly Hills, Calif. 90212
Filed Jun. 10, 1985, Ser. No. 743,019
Term of patent 14 years
U.S. Cl. D6—334

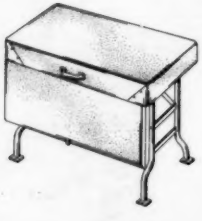
293,169
CHAIR
Maurizio Salvato, Gallarate, Italy, assignor to Saporiti Italia, S.p.A., Italy
Filed Mar. 15, 1985, Ser. No. 712,362
Claims priority, application Italy, Sep. 18, 1984, 23173/84[U]
Term of patent 14 years
U.S. Cl. D6—334

293,170
PORTABLE SEAT
Frank L. Roberts, Thornhill, Canada, assignor to Bio-Support Industries Ltd., Toronto, Canada
Filed Jul. 31, 1985, Ser. No. 760,803
Term of patent 14 years
U.S. Cl. D6—368

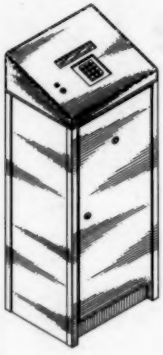


293,171
CHAIR
Karl W. Lübke, Portlandstrasse 21, 4840 Rheda-Wiedenbrück, Fed. Rep. of Germany
Filed May 14, 1985, Ser. No. 734,381
Claims priority, application Fed. Rep. of Germany, Nov. 20, 1984, 1863
Term of patent 14 years
U.S. Cl. D6—370

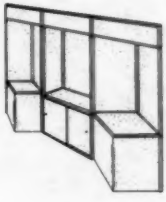
293,172
PORTABLE TABLE
Ralph N. Weiss, 2681 - 13th St. N., Naples, Fla. 33940
Filed Jul. 8, 1985, Ser. No. 752,667
Term of patent 14 years
U.S. Cl. D6—429



293,173
CONSOLE FOR CONTROLLING ACCESS TO MULTIPLE COMPARTMENT CABINETS
Richard J. Chester, Kennedy, N.Y., assignor to American Locker Group Incorporated, Jamestown, N.Y.
Filed May 20, 1985, Ser. No. 735,767
Term of patent 14 years
U.S. Cl. D6—432

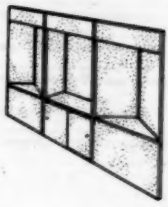


293,174
DISPLAY STAND
Melvin M. Miller, 3617 Essex Ct., Bloomington, Ind. 47401
Filed Mar. 21, 1985, Ser. No. 714,636
The portion of the term of this patent subsequent to Feb. 12, 1999, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—436

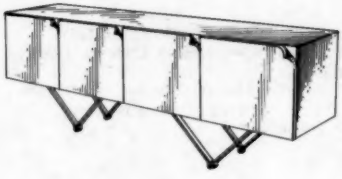


293,175
DISPLAY STAND
Melvin M. Miller, 3617 Essex Ct., Bloomington, Ind. 47401
Filed Apr. 16, 1985, Ser. No. 723,931
The portion of the term of this patent subsequent to Feb. 12, 1999, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—436

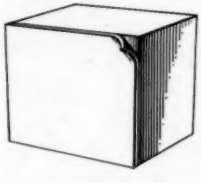
293,176
DISPLAY STAND
Melvin M. Miller, 3617 Essex Ct., Bloomington, Ind. 47401
Filed Mar. 21, 1985, Ser. No. 714,578
The portion of the term of this patent subsequent to Dec. 11, 1998, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—436



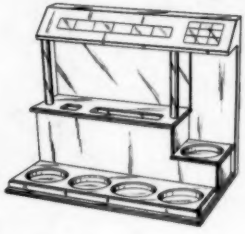
293,177
BUFFET
Demir Hamami, 4938 Battery La. Apt. 5, Bethesda, Md. 20814
Filed Jul. 12, 1985, Ser. No. 754,143
Term of patent 14 years
U.S. Cl. D6—446



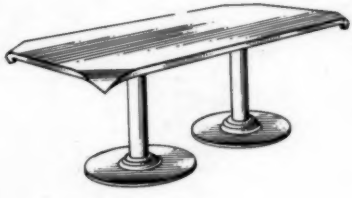
293,178
CABINET
Demir Hamami, 4938 Battery La. Apt. 5, Bethesda, Md. 20814
Filed Jul. 12, 1985, Ser. No. 754,147
Term of patent 14 years
U.S. Cl. D6—448



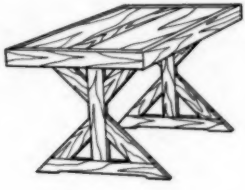
293,179
ENGLISH PUB ELECTRONIC BAR
Jonathan W. Balisteri, P.O. Box 11574, Costa Mesa, Calif. 92627
Filed May 1, 1985, Ser. No. 729,370
Term of patent 14 years
U.S. Cl. D6—474



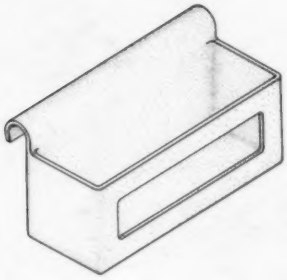
293,180
TABLE
Demir Hamami, 4938 Battery La., Apt. 5, Bethesda, Md. 20814
Filed Jul. 12, 1985, Ser. No. 754,139
Term of patent 14 years
U.S. Cl. D6—480



293,181
TABLE
Daniel S. Solaro, 10215 SE. 29th St., Bellevue, Wash. 98004
Filed May 31, 1985, Ser. No. 739,660
Term of patent 14 years
U.S. Cl. D6—484

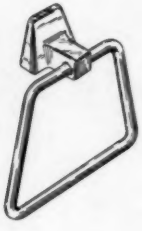


293,182
TISSUE BOX HOLDER
Clyde L. Carter, 1021 - 7th St. West, Birmingham, Ala. 35204
Filed Mar. 28, 1985, Ser. No. 717,003
Term of patent 14 years
U.S. Cl. D6—518

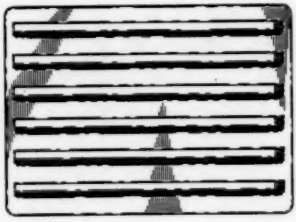


293,183
BATH CADDY
Willard Aaron, 616 Skokie La. South, Glencoe, Ill. 60022
Filed May 13, 1985, Ser. No. 733,099
Term of patent 14 years
U.S. Cl. D6—525

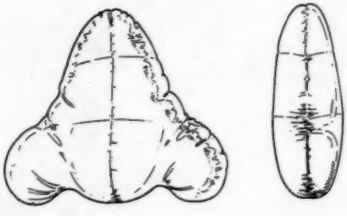
293,184
TOWEL HOLDER
John P. Chap, Lemont, Ill., assignor to Selfix, Inc., Chicago, Ill.
Filed Jan. 4, 1985, Ser. No. 689,084
Term of patent 14 years
U.S. Cl. D6—546



293,185
WALL MOUNTED SUPPORT
André Morin, Pointe Claire, Canada, assignor to Andre Morin Designers Inc., Pointe Claire, Canada
Filed Dec. 3, 1984, Ser. No. 677,594
Term of patent 14 years
U.S. Cl. D6—553

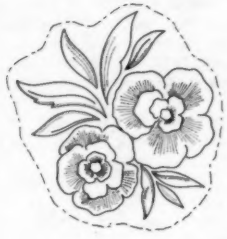


293,186
BACK SUPPORT PILLOW
Leon Parnham, 6 Windermere Crescent, Brighton, Victoria, Australia
Filed May 19, 1986, Ser. No. 864,129
Term of patent 14 years
U.S. Cl. D6—601

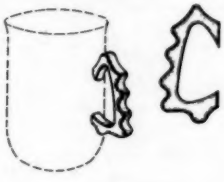


293,187
DECALCOMANIA OR THE LIKE FOR CHINA DINNERWARE
Jeanette Mattson, Syracuse, N.Y., assignor to Syracuse China Corporation, Syracuse, N.Y.
Filed Mar. 15, 1985, Ser. No. 712,077
Term of patent 14 years
U.S. Cl. D7—39

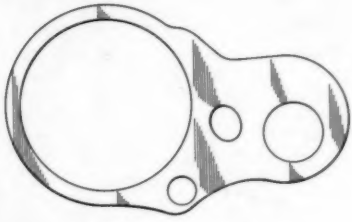
293,188
DECALCOMANIA OR THE LIKE FOR CHINA DINNERWARE
Helen Zughaib, Syracuse, N.Y., assignor to Syracuse China Corporation, Syracuse, N.Y.
Filed Mar. 15, 1985, Ser. No. 712,074
Term of patent 14 years
U.S. Cl. D7—39



293,189
HANDLE FOR A CUP OR SIMILAR ARTICLE
Lucie S. Sandler, 6500 N. Kolmar, Lincolnwood, Ill. 60646
Filed Feb. 22, 1985, Ser. No. 704,170
Term of patent 14 years
U.S. Cl. D7—39

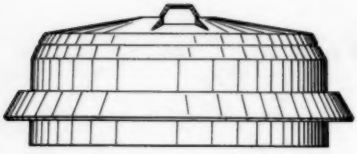


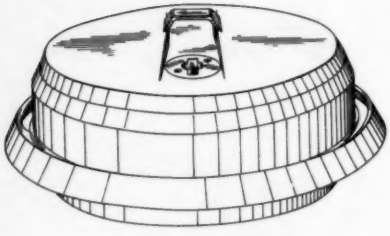
293,190
COMBINED PLATE AND CUP TRAY
Frederick P. Flanagan, Sr., 27 Forest Park Ave., Tyngsboro, Mass. 01879
Filed Jan. 31, 1985, Ser. No. 696,805
Term of patent 14 years
U.S. Cl. D7—71



293,191
PORTABLE OUTDOOR FIREPLACE
James C. Stephen, Arlington Heights; Charles W. Lohmeyer, Barrington, and Bernard B. Bluestein, Des Plaines, all of Ill., assignors to Weber-Stephen Products Co., Palatine, Ill.
Filed May 28, 1985, Ser. No. 737,726
Term of patent 14 years
U.S. Cl. D7—332

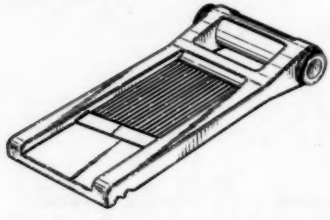
293,192
COMBINED COOK POT AND CONTAINER FOR FOOD
Giuseppe Baggioli, Via Como, 4, Lecco (Como), Italy
Filed Feb. 7, 1985, Ser. No. 699,074
Claims priority, application Italy, Aug. 7, 1984, 22817/84[U]
Term of patent 14 years
U.S. Cl. D7—354

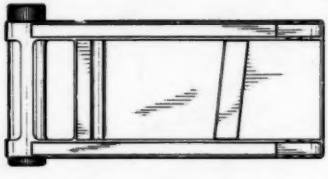




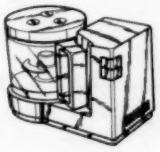
293,193
BREAD DOUGH TRAY
David L. Vandervoort, Orange County, Calif., assignor to Bridgford Foods Corporation, Anaheim, Calif.
Filed Jan. 11, 1985, Ser. No. 690,636
Term of patent 14 years
U.S. Cl. D7—357

293,194
FOOD SLICER
Julius Kreth, Pfungstadt, Fed. Rep. of Germany, assignor to Mike & Kremmel, Ltd., Kowloon, Hong Kong
Filed Jan. 29, 1985, Ser. No. 696,676
Claims priority, application United Kingdom, Aug. 1, 1984, 1021262
Term of patent 14 years
U.S. Cl. D7—381





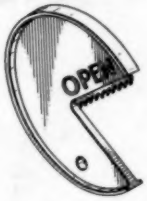
293,195
FOOD PROCESSOR
Young S. Kim, Terrace Sunnyvale, Calif., assignor to Daewoo Electronics Co., Ltd., Seoul, Rep. of Korea
Filed Oct. 1, 1984, Ser. No. 656,539
Term of patent 14 years
U.S. Cl. D7—384



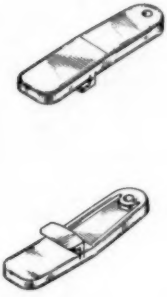
293,196
HEAD ASSEMBLY FOR A RAKE
Robert A. Germain, and William E. Portz, both of Anderson, S.C., assignors to USM Corporation, Farmington, Conn.
Filed Aug. 8, 1985, Ser. No. 763,747
Term of patent 14 years
U.S. Cl. D8—13

293,197
BOTTLE OPENER
Edwin A. Schumacher, and Edna E. Schumacher, both of Rte. 6, 307A-420, Greenville, Tex. 75401
Filed May 3, 1985, Ser. No. 730,063
Term of patent 14 years
U.S. Cl. D8—18

293,198
BOTTLE OPENER
Edwin A. Schumacher, and Edna E. Schumacher, both of Rte. 6, 307A-420, Greenville, Tex. 75401
Filed May 3, 1985, Ser. No. 729,940
Term of patent 14 years
U.S. Cl. D8—18

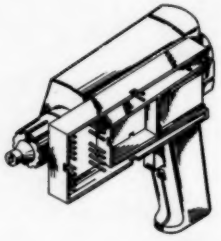



293,199
HAND-HELD CAN OPENER
J. David Grenley, 29 Lorelei La., Menlo Park, Calif. 94025
Filed Jul. 16, 1984, Ser. No. 631,537
Term of patent 14 years
U.S. Cl. D8—18



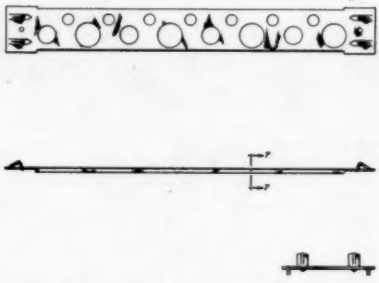
293,200
CORK PULLER
Charles A. Barone, 44 Lesley La., New Castle, Del. 19720
Filed Jan. 25, 1985, Ser. No. 694,805
Term of patent 14 years
U.S. Cl. D8—42

293,201
COMBINED CORDLESS ELECTRIC DRILL, HOLSTER AND CHARGING BASE THEREFOR
Lawrence E. House, II, and Robert I. Somers, both of Raleigh, N.C., assignors to Black & Decker, Inc., Newark, Del.
Division of Ser. No. 646,138, Aug. 31, 1984. This application Nov. 25, 1985, Ser. No. 789,125
Term of patent 14 years
U.S. Cl. D8—68

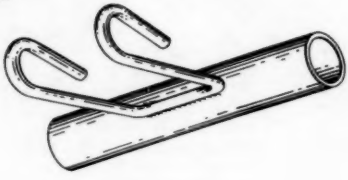


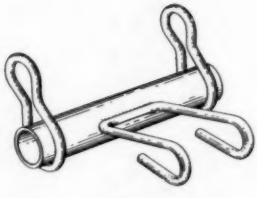
293,202
UTILITY KNIFE HANDLE
Robert F. West, West Simsbury, and George F. Weimann, Avon, both of Conn., assignors to The Stanley Works, New Britain, Conn.
Filed Feb. 16, 1984, Ser. No. 580,846
Term of patent 14 years
U.S. Cl. D8—99

293,203
STUD MOUNT, PIPE SUPPORT BRACKET
Thomas J. Hertensteiner, 16918 S. Edwards Rd., Cerritos, Calif. 90701
Filed Sep. 9, 1985, Ser. No. 774,151
Term of patent 14 years
U.S. Cl. D8—354

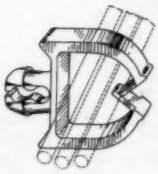


293,204
SUPPORT BRACKET FOR KEY BOX
Antoine Trubiano, Pointe aux Trembles, Canada, assignor to Cari-All Inc., Montreal, Canada
Filed Nov. 13, 1984, Ser. No. 670,269
Term of patent 14 years
U.S. Cl. D8—380

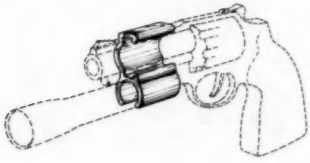




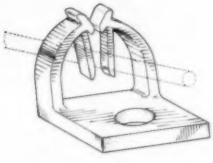
293,205
MINI ELECTRIC WIRE CLAMP
Yoshihito Nakano, Yokohama, Japan, assignor to Kitagawa Industries Co., Ltd., Aichi, Japan
Filed Jan. 3, 1985, Ser. No. 688,334
Term of patent 14 years
U.S. Cl. D8—395



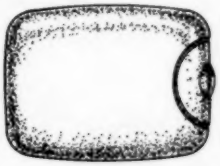
293,206
ILLUMINATION ATTACHMENT CLIP FOR FIREARMS
David L. Beaty, 958 W. Emerald Cir., and William W. Loughrige, 965 W. Enid Cir., both of Mesa, Ariz. 85202
Filed Oct. 28, 1985, Ser. No. 791,717
Term of patent 14 years
U.S. Cl. D8—395



293,207
ELECTRIC WIRE CLAMP
Yoshihito Nakano, Yokohama, Japan, assignor to Kitagawa Industries Co., Ltd., Nagoya, Japan
Filed Jan. 3, 1985, Ser. No. 688,337
Term of patent 14 years
U.S. Cl. D8—396



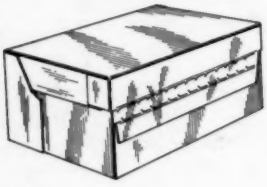
293,208
DISPENSING BOTTLE
Johannes van der Heijden, Hilversum, Netherlands, assignor to S. C. Johnson & Son, Inc., Racine, Wis.
Filed Apr. 8, 1985, Ser. No. 721,009
Term of patent 14 years
U.S. Cl. D9—367



293,209
BOTTLE
Piet C. Cahusak, Ede, Netherlands, assignor to Intradal Nederland BV, Amersfoort, Netherlands
Filed Oct. 1, 1984, Ser. No. 656,787
Claims priority, application Benelux, May 30, 1984, 59035-00
Term of patent 14 years
U.S. Cl. D9—375

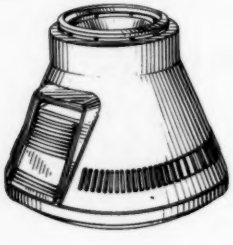
293,210
BOTTLE OR THE LIKE
George R. Conrad, Elk Grove, Ill., assignor to Continental Plastic Containers, Inc., Stamford, Conn.
Filed Feb. 5, 1985, Ser. No. 698,444
Term of patent 14 years
U.S. Cl. D9—405

293,211
ICE CREAM CARTON
Richard E. DePaul, West Chester, Pa., and Jack E. Hutchinson, Sr., Newark, N.Y., assignors to Rendoll Paper Company, Rochester, N.Y.
Filed May 6, 1987, Ser. No. 46,505
Term of patent 14 years
U.S. Cl. D9—416

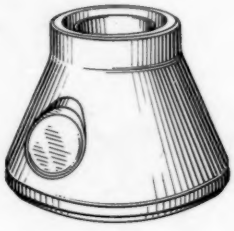


293,212
COMBINED PACKAGING AND DISPLAY CONTAINER
Alessandro Zuliani, Udine, Italy, assignor to Cosatto SpA, Martignacco, Italy
Filed Mar. 1, 1985, Ser. No. 707,297
Claims priority, application Italy, Sep. 3, 1984, 60437/84[U]
Term of patent 14 years
U.S. Cl. D9—418

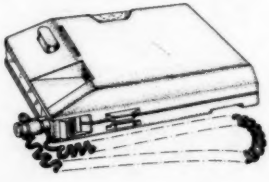
293,213
ACTUATOR CAP
James R. Crapser, Racine County, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.
Filed Apr. 18, 1985, Ser. No. 724,421
Term of patent 14 years
U.S. Cl. D9—448



293,214
VALVE ACTUATOR CAP
James R. Crapser, Racine County, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.
Filed Apr. 18, 1985, Ser. No. 724,378
Term of patent 14 years
U.S. Cl. D9—448



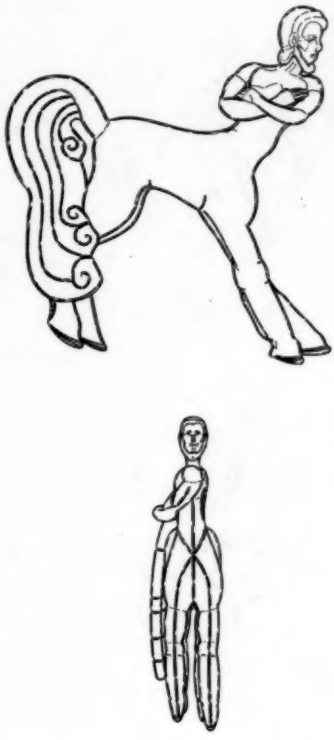
293,215
ELECTRONIC THERMOMETER
Robert H. Bruno, Avon; Laurie J. Burger, North Branford; Stuart Kipperman, Easton; Geoffrey R. Mayer, Trumbull; Donald E. Protzmann, Litchfield, and Robert F. Uhl, Cheshire, all of Conn., assignors to Sherwood Medical Co., St. Louis, Mo.
Filed Dec. 4, 1984, Ser. No. 677,921
Term of patent 14 years
U.S. Cl. D10—57



293,216
GOOSE CALLER
James Fernandez, P.O. Box 816, Groves, Tex. 77619
Filed Jan. 31, 1986, Ser. No. 824,740
Term of patent 14 years
U.S. Cl. D10—119

293,217
EAR ORNAMENT
Thomas O'Donovan, Harbor Square, Camden, Me. 04843
Filed May 30, 1985, Ser. No. 739,201
Term of patent 14 years
U.S. Cl. D11—78

293,218
CENTAUR FIGURE
Diane Insetta, 8444 San Jose Blvd., Jacksonville, Fla. 32217
Filed Jul. 26, 1985, Ser. No. 759,305
Term of patent 14 years
U.S. Cl. D11—159

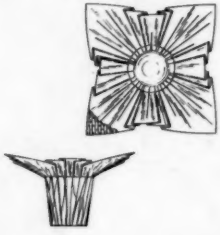


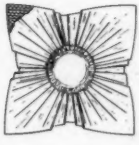
293,219
TROPHY ORNAMENT
Ray H. Pierce, Gravenhurst, Canada, assignor to Tromar Corporation Ltd., Mississauga, Canada
Filed Nov. 12, 1985, Ser. No. 804,354
Term of patent 14 years
U.S. Cl. D11—161

293,220
TROPHY ORNAMENT
Ray H. Pierce, Gravenhurst, Canada, assignor to Tromar Corporation Ltd., Mississauga, Canada
Filed Aug. 30, 1985, Ser. No. 770,934
Term of patent 14 years
U.S. Cl. D11—161

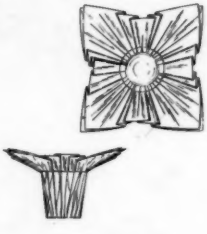
293,221
TROPHY ORNAMENT
Ray H. Pierce, Gravenhurst, Canada, assignor to Tromar Corporation Ltd., Mississauga, Canada
Filed Aug. 30, 1985, Ser. No. 770,935
Term of patent 14 years
U.S. Cl. D11—161

293,222
FLOWER POT COVER
Donald E. Weder, Highland; Robert C. Abrams, Edwardsville, and Erwin H. Weder, Highland, all of Ill., assignors to Highland Supply Corporation, Highland, Ill.
Continuation-in-part of Ser. No. 613,053, May 22, 1984. This application Sep. 21, 1984, Ser. No. 652,883
The portion of the term of this patent subsequent to Dec. 15, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D11—164

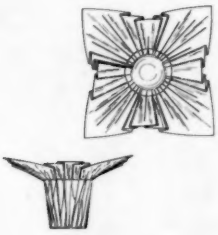




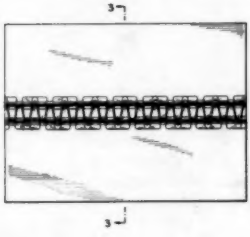
293,223
FLOWER POT COVER
Donald E. Weder; Erwin H. Weder, both of Highland, and Robert C. Abrams, Edwardsville, all of Ill., assignors to Highland Supply Corporation, Highland, Ill.
Continuation-in-part of Ser. No. 613,053, May 22, 1984. This application Sep. 21, 1984, Ser. No. 652,882
The portion of the term of this patent subsequent to Dec. 15, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D11—164



293,224
FLOWER POT COVER
Donald E. Weder, and Erwin H. Weder, both of Highland, Ill., assignors to Highland Supply Corporation, Highland, Ill.
Filed May 22, 1984, Ser. No. 613,053
The portion of the term of this patent subsequent to Dec. 15, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D11—164

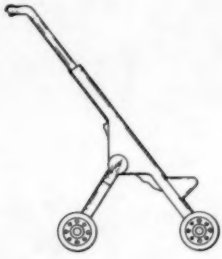


293,225
SLIDE FASTENER CHAIN
Akira Hasegawa, Kurobe, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan
Filed Aug. 9, 1984, Ser. No. 638,991
Term of patent 14 years
U.S. Cl. D11—221



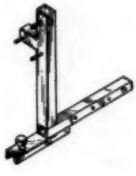
293,226
LINER FOR VEHICLE CARGO SPACE
Richard L. Whitson, Box 363, R.R. 6, Lawrence, Kans. 66044
Filed Apr. 22, 1985, Ser. No. 725,482
Term of patent 14 years
U.S. Cl. D12—98

293,227
DOLL STROLLER
Craig J. McElhaney, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Aug. 2, 1985, Ser. No. 762,138
Term of patent 14 years
U.S. Cl. D12—129

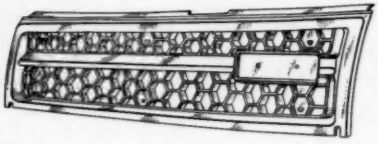


293,228
MOTORCYCLE TIRE
Nobuyuki Sakaki, Hyogo, Japan, assignor to Sumimoto Rubber Industries, Ltd., Hyogo, Japan
Filed Mar. 22, 1985, Ser. No. 715,029
Claims priority, application Japan, Sep. 25, 1984, 59-39999
Term of patent 14 years
U.S. Cl. D12—145

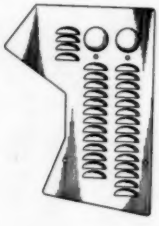
293,229
COMBINED SPARE TIRE AND TRAILER HITCH FOR STANDARD RECEIVER BARS
Roland A. Smith, 2483 American Ave., Hayward, Calif. 94545
Filed Nov. 8, 1985, Ser. No. 804,359
Term of patent 14 years
U.S. Cl. D12—162



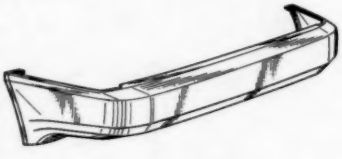
293,230
AUTOMOBILE RADIATOR GRILL
Norihiko Kawaoka, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan
Filed Dec. 30, 1985, Ser. No. 814,916
Term of patent 14 years
U.S. Cl. D12—163



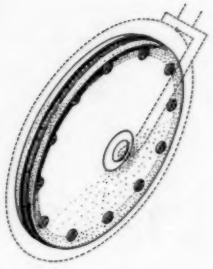
293,231
DEFLECTOR PLATE FOR THE UNDERBODY OF A SPORTS CAR
Rick L. Schneck, 15189 Marl St., Linden, Mich. 48451
Filed Dec. 20, 1984, Ser. No. 684,337
Term of patent 14 years
U.S. Cl. D12—190



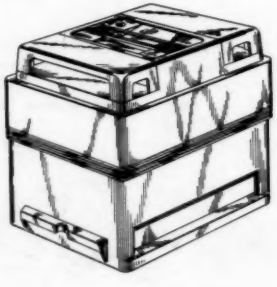
293,232
REAR BUMPER FOR AN AUTOMOBILE
Masami Ikuma, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan
Filed Dec. 10, 1985, Ser. No. 807,478
Claims priority, application Japan, Aug. 30, 1985, 60-36948
Term of patent 14 years
U.S. Cl. D12—169



293,233
BICYCLE WHEEL COVER
Roger M. Berg, 8025 SW. 185th Ave., Beaverton, Oreg. 97007
Filed Aug. 20, 1986, Ser. No. 898,434
Term of patent 14 years
U.S. Cl. D12—204



293,234
BATTERY
Garry Helou, Merrylands, and Kevin Whitley, South Hurstville, both of Australia, assignors to Repco Limited, Melbourne, Australia
Filed Sep. 16, 1985, Ser. No. 776,692
Claims priority, application Australia, Mar. 18, 1985, 0661/85
Term of patent 14 years
U.S. Cl. D13—8



293,235

HOLDER FOR ELECTRICAL CABLE MARKERS

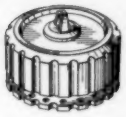
Torbjorn H. Loof, Otterbacken, Sweden, assignor to Partex Fabriksaktiebolag, Gullspang, Sweden

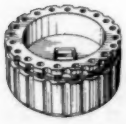
Filed Sep. 7, 1984, Ser. No. 648,107

Claims priority, application Sweden, Mar. 7, 1984, 84-0791; Mar. 7, 1984, 84-0792; Mar. 7, 1984, 84-0793

Term of patent 14 years

U.S. Cl. D13—13





293,236

COMBINATION TELEPHONE HANDSET AND KEYBOARD CONSOLE BASE

Louis L. Mastro, Milford, and Robert L. Demick, East Detroit, both of Mich., assignors to Square D Company, Palatine, Ill.

Filed Oct. 26, 1984, Ser. No. 665,247

Term of patent 14 years

U.S. Cl. D14—53

293,237

TELEPHONE SET

Michael Brown, Nepean, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Dec. 10, 1985, Ser. No. 807,402

Term of patent 14 years

U.S. Cl. D14—53

293,238

HANDSET TELEPHONE

Francois Elie, Paris, France, assignor to Horlogerie Photographique Francais, Bonneville, France

Filed Aug. 4, 1986, Ser. No. 893,109

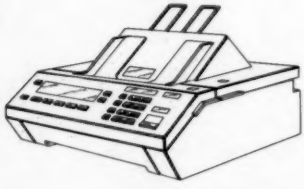
Claims priority, application France, Feb. 26, 1986, 86 0932

Term of patent 14 years

U.S. Cl. D14—64

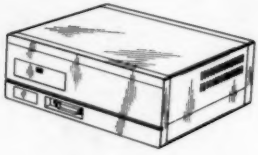
293,239
RADIO CONTROL UNIT OR SIMILAR ARTICLE
Kenneth W. Larson, Elmhurst, and Albert L. Nagele, Wilmette, both of, IL, assignors to Motoroia, Inc., Schaumburg, Ill.
Filed Jun. 17, 1985, Ser. No. 745,962
Term of patent 14 years
U.S. Cl. D14—68

293,240
FACSIMILE TRANSCEIVER/RECEIVER
Masanori Hashimoto, Kanagawa, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan
Filed Jul. 30, 1985, Ser. No. 760,494
Claims priority, application Japan, Jan. 30, 1985, 60-3110
Term of patent 14 years
U.S. Cl. D14—94

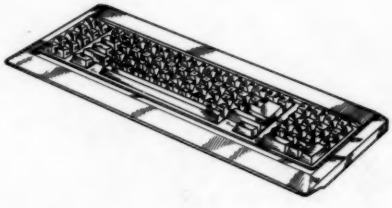


293,241
POCKET TERMINAL
Anthony W. Wan, Forest Hills, and Larry S. Kopp, New York, both of N.Y., assignors to Citicorp Credit Services, Inc., New York, N.Y.
Filed Oct. 16, 1985, Ser. No. 788,250
Term of patent 14 years
U.S. Cl. D14—100

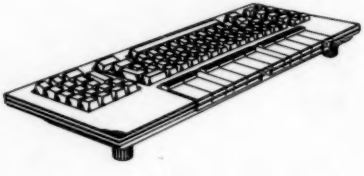
293,242
CONTROLLER FOR A POINT-OF-SALES SYSTEM
Shirou Hujimori, Koganei, and Masayoshi Miyazaki, Hatano, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Feb. 25, 1985, Ser. No. 704,723
Claims priority, application Japan, Aug. 27, 1984, 59-35415
Term of patent 14 years
U.S. Cl. D14—100



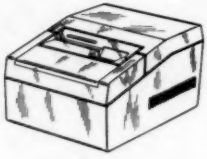
293,243
KEYBOARD
Yoshinori Kakiuchi, Kawasaki, Japan, assignor to Fujitsu Limited, Kanagawa, Japan
Filed Nov. 21, 1985, Ser. No. 806,571
Claims priority, application Japan, May 21, 1985, 60-20977
Term of patent 14 years
U.S. Cl. D14—114



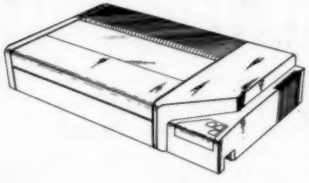
293,244
KEYBOARD OR SIMILAR ARTICLE
Robin Chu, San Francisco, and John W. Toor, Palo Alto, both of Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed Oct. 28, 1985, Ser. No. 791,848
Term of patent 14 years
U.S. Cl. D14—100



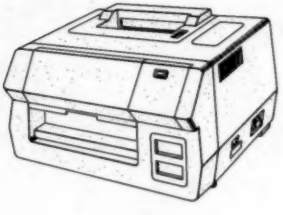
293,245
PRINTER FOR A POINT-OF-SALES SYSTEM
Shirou Hujimori, Koganei, and Kouichi Katou, Yokohama, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Feb. 25, 1985, Ser. No. 704,724
Claims priority, application Japan, Aug. 27, 1984, 59-35414
Term of patent 14 years
U.S. Cl. D14—100



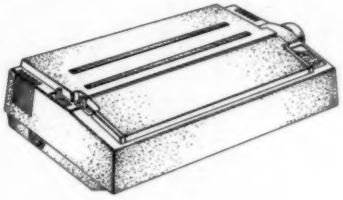
293,246
ELECTRONIC PRINTER
Loyd C. Moore, King County, Wash., assignor to Output Technology Corporation, Spokane, Wash.
Filed Jan. 4, 1985, Ser. No. 688,698
Term of patent 14 years
U.S. Cl. D14—111



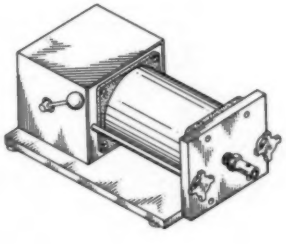
293,247
LASER PRINTER
Kenichi Nakade, Kanagawa, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan
Filed Apr. 2, 1985, Ser. No. 718,932
Claims priority, application Japan, Oct. 2, 1984, 59-40889
Term of patent 14 years
U.S. Cl. D14—111



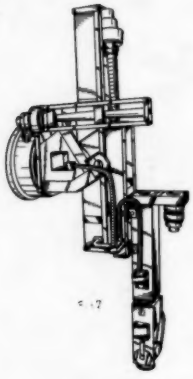
293,248
PRINTER
Nobuki Matsumoto, Kanagawa, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan
Filed May 13, 1985, Ser. No. 733,598
Claims priority, application Japan, Nov. 13, 1984, 59-46753
Term of patent 14 years
U.S. Cl. D14—111



293,249
CARBON DIOXIDE COMPRESSING GENERATOR FOR DRY ICE MANUFACTURE
Morton Milden, West Orange, N.J., assignor to Bel-Art Products, Inc., Pequannock, N.J.
Filed Sep. 20, 1985, Ser. No. 778,236
Term of patent 14 years
U.S. Cl. D15—9

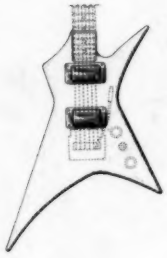


293,250
INDUSTRIAL ROBOT
Herbert Kaufmann, and Ulf Back, both of Västerås, Sweden, assignors to Asea AB, Västerås, Sweden
Filed Dec. 2, 1985, Ser. No. 803,487
Claims priority, application Sweden, Jun. 4, 1985, 85-1451
Term of patent 14 years
U.S. Cl. D15—199

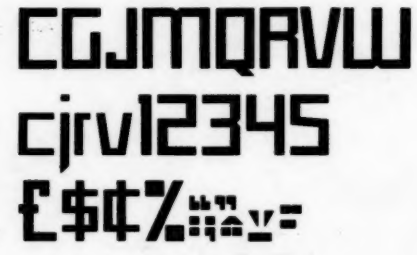


293,251
SPECTACLES
Joseph Kanoui, Geneva, Switzerland, assignor to Interdica S.A., Villars-sur-Glane, Switzerland
Filed Dec. 17, 1985, Ser. No. 810,050
Claims priority, application Int'l Pat. Institute, Jun. 17, 1985, DM/005413
Term of patent 14 years
U.S. Cl. D16—102

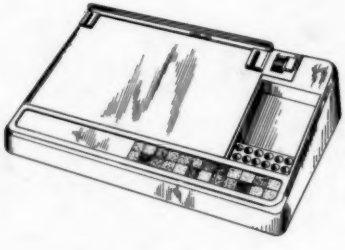
293,252
GUITAR BODY
Michael V. Powers, Meridian, Miss., assignor to Peavey Electronics Corporation, Meridian, Miss.
Filed Dec. 27, 1985, Ser. No. 814,243
Term of patent 14 years
U.S. Cl. D17—20



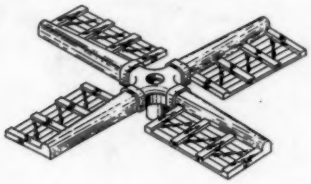
293,253
FONT OF TYPE
Rudolph Shepherd, 1208 Sheridan Ave., Chattanooga, Tenn. 37406
Filed Feb. 25, 1985, Ser. No. 705,234
Term of patent 14 years
U.S. Cl. D18—24



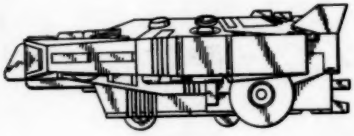
293,254
ACTIVITY DESK
Mel Appel, Livingston, and George Kress, Scotch Plains, both of N.J., assignors to The Mel Appel Company, Short Hills, N.J.
Filed Dec. 4, 1984, Ser. No. 677,928
Term of patent 14 years
U.S. Cl. D21—59



293,255
TOY WINDMILL ARM OR SIMILAR ARTICLE
Erik P. Tapdrup, Virum, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Dec. 4, 1985, Ser. No. 805,351
Term of patent 14 years
U.S. Cl. D21—119

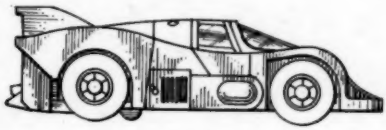


293,256
TOY VEHICLE
Tatsuya Suzuki, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Nov. 15, 1985, Ser. No. 805,211
Claims priority, application Japan, May 17, 1985, 60-20438
Term of patent 14 years
U.S. Cl. D21—128



293,257
HANDLE FOR SPORT RACKET OR SIMILAR ARTICLE
Ian J. Miller, 31 Heywood Avenue, Diss, Norfolk, United Kingdom
Filed Feb. 26, 1985, Ser. No. 705,736
Claims priority, application United Kingdom, Nov. 24, 1984, 1023538
Term of patent 14 years
U.S. Cl. D21—230

293,258
TOY VEHICLE
Mitsunori Noshiro, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Nov. 6, 1985, Ser. No. 803,897
Claims priority, application Japan, May 17, 1985, 60-20435
Term of patent 14 years
U.S. Cl. D21—136

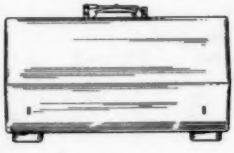


293,259
WATER SKI
Patrick J. Connelly, Freeland, and Denis J. Hoyt, Lynnwood, both of Wash., assignors to Connelly Skis, Inc., Lynnwood, Wash.
Filed Aug. 30, 1985, Ser. No. 771,062
Term of patent 14 years
U.S. Cl. D21—229

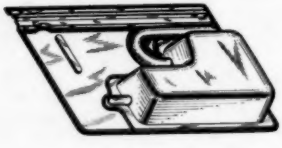
293,260
WATER SKI
Patrick J. Connelly, Freeland, and Denis J. Hoyt, Lynnwood, both of Wash., assignors to Connelly Skis, Inc., Lynnwood, Wash.
Filed Aug. 30, 1985, Ser. No. 771,063
Term of patent 14 years
U.S. Cl. D21—229

293,261
GOLFER'S AID
John E. Sadowski, 26826 Rouge River Dr., Dearborn Heights, Mich. 48127
Filed Nov. 19, 1984, Ser. No. 672,914
Term of patent 14 years
U.S. Cl. D21—234

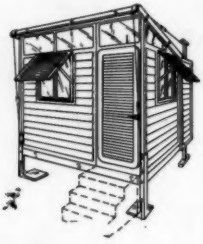
293,262
TANK
Michael T. Sayward, 1406 SW. 8th St., Pompano Beach, Fla. 33060
Filed Apr. 3, 1986, Ser. No. 847,880
Term of patent 14 years
U.S. Cl. D23—202



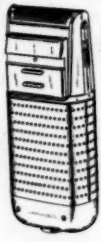
293,263
IN-TANK AUTOMATIC TOILET CLEANING DEVICE
Walter M. Ronayne, Westfield, N.J., assignor to Boyle-Midway Household Products, Inc., New York, N.Y.
Filed Jan. 22, 1985, Ser. No. 693,397
Term of patent 14 years
U.S. Cl. D23—208



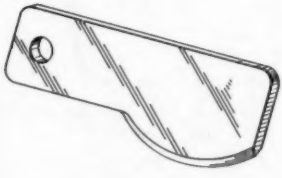
293,264
MODULAR HOME
Richard L. Stevenson, 8158 Manitoba, No. 3, Playa Del Rey, Calif. 90293
Filed Dec. 18, 1986, Ser. No. 943,154
Term of patent 14 years
U.S. Cl. D25—30



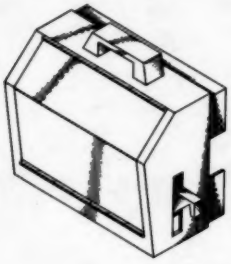
293,265
ELECTRIC DRY SHAVER
Roland Ullman, Offenbach-Rumpenheim, Fed. Rep. of Germany, assignor to Braun Aktiengesellschaft, Kronberg, Fed. Rep. of Germany
Filed Jan. 16, 1985, Ser. No. 691,987
Claims priority, application Fed. Rep. of Germany, Sep. 4, 1984, 73 MR 9314
The portion of the term of this patent subsequent to Oct. 28, 2000, has been disclaimed.
Term of patent 14 years
U.S. Cl. D28—49



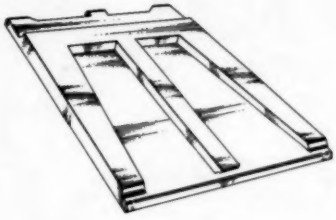
293,266
SCRAPER FOR LOTTERY TICKETS
George Stanich, 609 - 21st St., West Des Moines, Iowa 50265
Filed Jan. 21, 1986, Ser. No. 820,062
Term of patent 14 years
U.S. Cl. D32—49



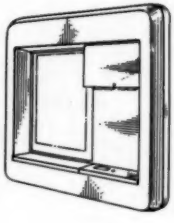
293,267
TRASH BAG CONTAINER
Clifton Massey, 1300 Clementine #11, Memphis, Tenn. 38106
Filed Jul. 30, 1985, Ser. No. 760,528
Term of patent 14 years
U.S. Cl. D34—7

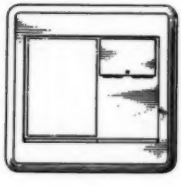


293,268
LID FOR A REFUSE CONTAINER
Kenneth M. Dewing, 1480 Nancy Cir., Porterville, Calif. 93257
Filed Nov. 22, 1985, Ser. No. 801,044
Term of patent 14 years
U.S. Cl. D34—11



293,269
AUTOMATED TELLER SERVICE CENTER ENCLOSURE
Ernest F. J. Prinzhorn, Los Angeles, Calif., assignor to QRS Corporation, Los Angeles, Calif.
Filed May 13, 1985, Ser. No. 710,007
Term of patent 14 years
U.S. Cl. D99—28





# LIST OF PATENTEES

## TO WHOM

## PATENTS WERE ISSUED ON THE 15TH DAY OF DECEMBER, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. B. Chance Company: *See*—
Kamp, Eugene L., 4,713,503, Cl. 200-144.00B.

A. E. Staley Manufacturing Company: *See*—
Downs, John D.; Drury, Raymond L., Jr.; Moser, Kenneth B.; and Roth, C. Deane, 4,713,436, Cl. 528-295.300.

A/S Alfred Benzon: *See*—
Kjornaes, Kim; and Linnemann, Jorgen, 4,713,248, Cl. 424-468.000.

A/S Niro Atomizer: *See*—
Veltman, Preston L., 4,713,226, Cl. 423-242.000.

A T & E Corporation: *See*—
Gaskill, Garold B.; Park, Daniel J.; Rullman, Robert G.; Rose, Donald T.; Stiley, Joseph F., III; Barnum, Lewis W.; and Hoff, Don G., 4,713,808, Cl. 370-94.000.

A. W. Cash Valve Manufacturing Corporation: *See*—
Lair, John E.; Luckenbill, Lawrence F.; and Holliday, Richard J., 4,712,575, Cl. 137-218.000.

Aaltonen, Lauri J.: *See*—
Lindemans, Willem; and Aaltonen, Lauri J., 4,712,607, Cl. 165-30.000.

AB Volvo: *See*—
Elverdam, Peter, 4,712,662, Cl. 192-53.00F.
Naert, Michel S., 4,712,824, Cl. 296-65.00R.

Abbondanti, Alberto, to Westinghouse Electric Corp. Load-commutated inverter and synchronous motor drive embodying the same. 4,713,743, Cl. 363-138.000.

Abe, Fumiyoshi, to Sony Corporation. Tape position display apparatus using counter roller pulses and CTL pulses. 4,713,715, Cl. 360-137.000.

Abe, Shunichi: *See*—
Kawamura, Naoto; and Abe, Shunichi, 4,713,684, Cl. 358-78.000.
Abe, Tomoaki; Fujisawa, Hideya; Omori, Norio; Kinugawa, Masumi; Ito, Katsunori; Akiyama, Susumu; Mizuno, Tiaki; and Yamada, Toshitaka, to Nippondenso Co., Ltd. Control system for an engine having an air intake passage. 4,713,765, Cl. 364-431.050.

Abel, Heinz: *See*—
Topfl, Rosemarie; and Abel, Heinz, 4,713,482, Cl. 560-196.000.

Abel, Kent W.; and Attoe, Gary N., to Kimberly-Clark Corporation. Apparatus and method for ultrasonic bonding of a moving web. 4,713,132, Cl. 156-73.100.

Abiko, Toshio: *See*—
Makimoto, Toshio; Nishimura, Sadahiko; Matsuo, Masayuki; Abiko, Toshio; Ishizaki, Hirohumi; Kanda, Minoru; Nunoya, Hidetsugu; and Komatsu, Mikio, 4,713,670, Cl. 343-700.0MS.

Abraham, Philip: *See*—
Chiang, Peter K.; Richard, Michelle M.; Padilla, Felipe N.; Carroll, Frank I.; and Abraham, Philip, 4,713,391, Cl. 514-412.000.

Abraham, William F., to Brunswick Valve & Control, Inc. Position controlled linear actuator. 4,712,441, Cl. 74-89.150.

AccuRay Corporation: *See*—
Bokowski, Gary A.; and Vahey, David W., 4,713,572, Cl. 310-323.000.

Ackel, Gary P.: *See*—
Kaiser, Timothy D.; and Ackel, Gary P., 4,712,602, Cl. 164-453.000.

Acker, Norman J.: *See*—
Price, Macy J.; Johnson, Mack E.; and Acker, Norman J., 4,712,842, Cl. 312-196.000.

Ackeret, Peter, to IDN Inventions and Development of Novelties AG. Container having automatic doors and for accommodating data storage media. 4,712,678, Cl. 206-387.000.

Acme Resin Corporation: *See*—
Armbruster, David R.; and Johnson, Calvin K., 4,713,294, Cl. 428-404.000.

Acufex Microsurgical, Inc.: *See*—
Honkanen, George P., 4,712,545, Cl. 128-305.000.

Adair, Paul C.; Hillenbrand, Gary F.; and Davis, Paul D., to Mead Corporation, The. Imaging system employing photosensitive microcapsules containing 3-substituted coumarins and other photobleachable sensitizers. 4,713,312, Cl. 430-138.000.

Adam, Peter; and Michel, Peter, to Siemens Aktiengesellschaft. Closed motor/transmission unit. 4,713,568, Cl. 310-112.000.

Adams, John T.; and Goodale, John B., to Emerson Electric Co. Gas burner control system with mass flow sensor. 4,712,996, Cl. 431-20.000.

Adams, Joseph S.; and Branston, Paul G., to Pow-R Tools Corporation. Manual recycler for detonating impact tool. 4,712,379, Cl. 60-632.000.

Adams, Nina M. Nina's Buttercup-Tihitian squash. 4,713,491, Cl. 800-1.000.

Addis, John L., to Tektronix, Inc. Active filter with bootstrapping. 4,713,627, Cl. 330-306.000.

Adenier, Herve : *See*—
Chaveron, Henri; Pontillon, Jean; Billon, Michel; Adenier, Herve ; and Kamoun, Ahmed, 4,713,256, Cl. 426-631.000.

Adidas Sportschuhfabriken Adi Dassler Stiftung & Co. KG: *See*—
Greiner, Peter; Pfluger, Hubert; and Widmann, Horst, 4,712,318, Cl. 36-134.000.

Adriaensen, Ludo; and Decouttere, Bernard, to N. V. Bekaert S. A. Process and apparatus for cleaning by electrochemical pickling with alternating current of specified frequency. 4,713,153, Cl. 204-144.500.

Adsett, Anthony P., to Litton Systems, Inc. Gas laser and method of making a gas laser. 4,713,825, Cl. 372-107.000.

Advanced Micro Devices, Inc.: *See*—
Iyer, Venkatraman; and Lee, Gil S., 4,713,605, Cl. 324-73.00R.

AE PLC: *See*—
Deane, Norman P., 4,712,443, Cl. 74-470.000.

AG fur industrielle Elektronik AGIE Losone b. Locarno: *See*—
Buhler, Ernst; and Rullo, Antonio, 4,713,516, Cl. 219-69.00P.
Lodetti, Attilio; and Blaser, Hansueli, 4,712,288, Cl. 29-557.000.

Agarwal, Arun K.; Knapp, Suzanne C.; and Lakness, David R., to Wang Laboratories, Inc. Data structure for a document processing system. 4,713,754, Cl. 364-200.000.

Agbay, Anthony J., to OMCO, Inc. Barrel lock with deterrent ring and key therefor. 4,712,395, Cl. 70-34.000.

Agency of Industrial Science and Technology: *See*—
Akiyama, Shigeru; Ueno, Hidetoshi; Imagawa, Koji; Kitahara, Akira; Nagata, Sumio; Morimoto, Kazuo; Nishikawa, Tooru; and Itoh, Masao, 4,713,277, Cl. 428-131.000.
Fujishima, Shizu; Yaku, Fumiko; and Koshijima, Tetsuo, 4,713,334, Cl. 435-99.000.

Agostini, Fabrizio, to Trast Enterprise S.r.l. Watch for displaying a line on the dial. 4,712,924, Cl. 368-76.000.

Ahlemeyer, W. Bruce: *See*—
Boone, Joseph E.; and Ahlemeyer, W. Bruce, 4,713,661, Cl. 340-994.000.

Ahlers, Klaas: *See*—
Osterloh, Rolf; Schupp, Eberhard; Loch, Werner; and Ahlers, Klaas, 4,713,440, Cl. 528-367.000.
Schupp, Eberhard; Osterloh, Rolf; Loch, Werner; and Ahlers, Klaas, 4,713,406, Cl. 523-415.000.

Ahmann, John E. Portable voting booth adapter. 4,712,757, Cl. 248-188.000.

Aikou, Kenichi; Kurihara, Yoichi; and Goto, Tsugio, to Asahi Kasei Kogyo Kabushiki Kaisha. Electronic delay detonator. 4,712,477, Cl. 102-206.000.

Air Products and Chemicals, Inc.: *See*—
Maroulis, Peter J.; Coe, Charles G.; Kuznicki, Steven M.; Clark, Patrick J.; and Roberts, David A., 4,713,362, Cl. 502-85.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Hochstein, Peter; and Imai, Nobuyuki, 4,712,433, Cl. 73-862.360.
Kodama, Hisashi; and Okabe, Yoshio, 4,713,045, Cl. 474-135.000.
Nakayama, Kouichi, 4,712,378, Cl. 60-525.000.

Aisin-Warner Kabushiki Kaisha: *See*—
Sumiya, Koji; and Moroto, Shuzo, 4,712,635, Cl. 180-197.000.

Ajmera, Prakash R.: *See*—
Jabarin, Saleh A.; and Ajmera, Prakash R., 4,713,269, Cl. 428-35.000.
Jabarin, Saleh A.; and Ajmera, Prakash R., 4,713,270, Cl. 428-35.000.

Akashi, Hiroyuki; Inoue, Takeshi; and Horie, Shoichi, to Yoshitomi Pharmaceutical Industries, Ltd. Alkanedicarboxylic diester compounds. 4,713,474, Cl. 560-66.000.

Akazawa, Kiyoshi: *See*—
Sasaki, Makoto; Yoshida, Jun; Shimizu, Yoshishige; Akazawa, Kiyoshi; Kishita, Eiji; and Hirata, Kaoru, 4,713,291, Cl. 428-373.000.

Akiyama, Shigeru; Ueno, Hidetoshi; Imagawa, Koji; Kitahara, Akira; Nagata, Sumio; Morimoto, Kazuo; Nishikawa, Tooru; and Itoh, Masao, to Agency of Industrial Science and Technology; and Shinko Kosen Kogyo Kabushiki Kaisha. Foamed metal and method of producing same. 4,713,277, Cl. 428-131.000.

Akiyama, Susumu: *See*—
Abe, Tomoaki; Fujisawa, Hideya; Omori, Norio; Kinugawa, Masumi; Ito, Katsunori; Akiyama, Susumu; Mizuno, Tiaki; and Yamada, Toshitaka, 4,713,765, Cl. 364-431.050.

Aktiebolaget Hassle: *See*—
Szelke, Michael; Jones, David M.; and Hallett, Allan, 4,713,445, Cl. 530-330.000.

Akzo America Inc.: *See*—
Birum, Gail H.; and Jansen, Richard F., 4,713,489, Cl. 564-90.000.

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Hochstein, Peter A.; and Imai, Nobuyuki, 4,712,432, Cl. 73-862.360.

Alban, Eugene P. Aircraft controls simulator. 4,713,007, Cl. 434-45.000.

Albanese, Andres; and Cheng, Steven S., to Bell Communications Research, Inc. Distributed star network. 4,712,859, Cl. 350-96.160.

Albertalli, David: *See—*
Mower, Dan C.; Wolf, Peter H.; Slade, Boyd E.; and Albertalli, David, 4,713,623, Cl. 328-72.000.

Albrecht, Leonard N., to California Auto Trends. Convertible top apparatus for midengine automobiles. 4,712,828, Cl. 296-121.000.

Aldrich-Boranes, Inc.: *See—*
Brown, Herbert C., 4,713,380, Cl. 568-1.000.

Alfa Romeo Auto S.p.A.: *See—*
Braga, Renzo; Pasquali, Renato; and Mendicino, Franco, 4,712,825, Cl. 296-76.000.

Alkaitis, Saulius A.: *See—*
Pinsky, Naum; and Alkaitis, Saulius A., 4,713,306, Cl. 429-218.000.

Allen, Jimmy D.; Cobb, Michael E.; Hillman, Robert S.; Mungall, Dennis R.; Ostoich, Vladimir E.; and Stroy, Gary H., to Biotrack, Inc. Integrated drug dosage form and metering system. 4,712,460, Cl. 83-208.000.

Allen, John E.; Glover, John D.; and Shepherd, Clayton C., Jr., to United States of America, Air Force. Thermal vacuum heater array apparatus. 4,713,647, Cl. 338-316.000.

Allied Colloids Limited: *See—*
Clarke, John B.; Firth, John F.; and Walker, John R., 4,713,264, Cl. 427-207.100.

Allied Corporation: *See—*
Bose, Debasis; and Freilich, Alfred, 4,712,603, Cl. 164-463.000.
Cage, Jerry L., 4,712,841, Cl. 303-92.000.
Gualtieri, Devlin M.; and Lai, Shui T., 4,713,577, Cl. 313-468.000.
Heller, Donald F., 4,713,824, Cl. 372-99.000.
Kwon, Young D.; Kavesh, Sheldon; and Prevorsek, Dusan C., 4,713,290, Cl. 428-364.000.
Losser, Gerald L.; and Weaver, Richard D., 4,712,767, Cl. 251-129.140.
Marsh, Gary B.; Fanelli, Anthony J.; Armor, John N.; and Zambri, Patrick M., 4,713,233, Cl. 423-608.000.
Morris, Robert C.; Long, Margaret N.; Chin, Timothy C.; and Heller, Donald F., 4,713,820, Cl. 372-41.000.
Temple, Robert B.; and Colpaert, James J., 4,712,654, Cl. 188-71.800.
Zwolinski, Leon M.; and Dwyer, Frank J., 4,713,400, Cl. 521-131.000.

Alloy Metals, Inc.: *See—*
Stern, Marvin J., 4,713,217, Cl. 420-452.000.

Allwin, Roger P.; and Budke, Mark P., to Lindsey Completion Systems. Liner hanger assembly with combination setting tool. 4,712,614, Cl. 166-208.000.

Alnafissa, Fahad A. Solar system simulator. 4,713,011, Cl. 434-292.000.

Alpegiani, Marco; Bedeschi, Angelo; Foglio, Maurizio; Franceschi, Giovanni; and Perrone, Ettore, to Farmitalia Carlo Erba S.p.A. 2-thiacephems and (5R) penems derivatives. 4,713,450, Cl. 540-214.000.

Alpegiani, Marco: *See—*
Perrone, Ettore; Alpegiani, Marco; Zarini, Franco; Bruna, Costantino D.; and Franceschi, Giovanni, 4,713,378, Cl. 514-192.000.

Alps Electric Co., Ltd.: *See—*
Asano, Isao, 4,713,703, Cl. 360-97.000.
Kimura, Kiyoshi; and Hara, Osamu, 4,713,496, Cl. 178-18.000.
Takoshima, Takehiro, 4,713,671, Cl. 346-76.0PH.

Altera Corporation: *See—*
Hartmann, Robert F.; Chan, Yiu-Fai; Frankovich, Robert J.; Ou, Jung-Hsing; So, Hock C.; and Wong, Sau-Ching, 4,713,792, Cl. 364-900.000.

Altmejd, Morrie, to Powerplex Technologies, Inc. Silicon diode looping element for protecting a battery cell. 4,713,597, Cl. 320-13.000.

Alumax, Inc.: *See—*
Koch, Alan A., 4,712,413, Cl. 72-361.000.

Aluminium Pechiney: *See—*
Chaffy, Joseph; Langon, Bernard; and Leroy, Michel, 4,713,161, Cl. 204-243.00M.

Alusuisse Italia, S.p.A.: *See—*
Fumagalli, Carlo; and Stefani, Giancarlo, 4,713,464, Cl. 549-259.000.

Alvarsson, Yngve. Method and machine for levelling concrete when casting large concrete areas. 4,712,943, Cl. 404-75.000.

Alyea, John W.: *See—*
Ellis, Roger H.; and Alyea, John W., 4,712,864, Cl. 350-96.220.

Amada Engineering & Service Co., Inc.: *See—*
Lee, Chun-Sheu, 4,713,818, Cl. 372-8.000.
Lee, Chun-Sheu, 4,713,822, Cl. 372-69.000.

Amax Inc.: *See—*
Cameron, Thomas B.; Swanson, Wilbur W.; Tartaglia, John M.; and Cox, Thomas B., 4,713,111, Cl. 75-68.00R.
Smit, Francis J.; Horst, William E.; and Bhasin, Anirudh K., 4,713,086, Cl. 44-51.000.

Ambrosio, Renato; Brosio, Alberto; Fausone, Alfredo; and Tofanelli, Adler, to SIP—Societa Italiana per l'Esercizio Telefonico p.a. Bidirectional digital transmission system with echo-cancellation. 4,713,803, Cl. 370-32.100.

American Can Company: *See—*
Kudert, Frederick G.; Latreille, Maurice G.; McHenry, Robert J.; Nahill, George F.; Pfutzenreuter, Henry, III; Tennant, William A.; Tung, Thomas T.; and Vella, John, Jr., 4,712,990, Cl. 425-130.000.

American Hospital Supply Corporation: *See—*
Bickelhaupt, Roger; and Rold, Michael D., 4,713,059, Cl. 604-171.000.
Gille, Henrick K.; Willing, Richard S.; Bloom, William G.; Siegel, Bernard; Cheung, Tsang; Lobodzinski, Richard; and Gilroy, Keith, 4,712,567, Cl. 128-771.000.

American Screen Printing Equipment Company: *See—*
Motev, Phil, 4,712,474, Cl. 101-38.00A.

American Standard Inc.: *See—*
Stairs, Henry M., Jr., 4,712,256, Cl. 4-661.000.

American Telephone and Telegraph Company, AT&T Bell Laboratories: *See—*
Brahm, David J.; Grinn, James M.; Hepler, Edward L.; and Schan, Edward P., Jr., 4,713,834, Cl. 379-28.000.
De Kelaita, Nergal R.; Hall, Joe T.; and Kletscher, Barrie D., 4,713,758, Cl. 364-200.000.
Krause, John T.; Kurkjian, Charles R.; and Paek, Un-Chul, 4,713,105, Cl. 65-4.100.
Oberlander, Lewis B.; Spicer, David A.; and Straubs, Ralph V., 4,713,806, Cl. 370-58.000.

American Telephone and Telegraph Company, AT&T Bell Labratories: *See—*
Presby, Herman M., 4,712,858, Cl. 350-96.150.

American Telephone and Telegraph Company, AT&T Information Systems: *See—*
Kimball, David B.; and Kip, Ruloff F., Jr., 4,713,564, Cl. 307-542.100.

Ames, Jimmy R.: *See—*
Bradford, James N.; Ames, Jimmy R.; and Montroll, Andrew H., 4,713,821, Cl. 372-44.000.

Ames, Theodore; and Brown, Vernon E., Jr., to Glacier Products, Inc. Apparatus for manufacturing soft ice cream and the like. 4,712,920, Cl. 366-144.000.

Amesbury Industries, Inc.: *See—*
Evans, Robert D.; and Blezard, Robert C., 4,713,130, Cl. 156-72.000.

Amoco Corporation: *See—*
Harris, James E.; and Robeson, Lloyd M., 4,713,426, Cl. 525-471.000.
Harris, James E.; Berger, Abe; Chopdekar, Vilas M.; Matzner, Markus; and Spanswick, James, 4,713,438, Cl. 528-337.000.
Smith, David J., 4,713,151, Cl. 204-58.500.

Amos, Charles W., to Owens-Illinois Closure Inc. Method and apparatus for marking and forming workpieces. 4,712,473, Cl. 101-4.000.

AMP Incorporated: *See—*
Forney, Edgar W., Jr.; and Hogendobler, Richard S., 4,712,296, Cl. 29-828.000.
Kobler, Robert J., 4,713,021, Cl. 439-272.000.

Ampex Corporation: *See—*
Hutson, John, 4,713,832, Cl. 377-45.000.

Amundson, David C.: *See—*
Thornander, Hans T.; Poore, John W.; Sholder, Jason A.; Thacker, James R.; and Amundson, David C., 4,712,555, Cl. 128-419.0PG.

Anagnostopulos, Hiristo: *See—*
Furrer, Harald; Anagnostopulos, Hiristo; and Gebert, Ulrich, 4,713,455, Cl. 544-267.000.

Andersen, David J.: *See—*
Poplawski, Judith A.; and Andersen, David J., 4,713,012, Cl. 434-373.000.

Andersen, George J.: *See—*
Karlis, Robert G.; Dole, Charles M.; Webster, Gary L.; and Andersen, George J., 4,712,713, Cl. 222-3.000.

Anderson-Cook, Inc.: *See—*
Killop, James T., 4,712,408, Cl. 72-88.000.
Killop, James T., 4,712,409, Cl. 72-88.000.
Killop, James T., 4,712,410, Cl. 72-108.000.

Anderson, George C.; and Paul, Richard J. Lidded nursery plant container. 4,712,329, Cl. 47-84.000.

Andiamo Inc.: *See—*
Myers, Jay E.; Myers, M. Todd; and Iravantchi, Siamak, 4,712,657, Cl. 190-28.000.

Ando Electric Co., Ltd.: *See—*
Sugimori, Masayasu; and Morishita, Mitsuhiro, 4,713,813, Cl. 371-15.000.

Ando, Shinji; Ohtaguro, Masami; Masuda, Takayoshi; and Watanabe, Yoshimoto, to Mitsui Toatsu Chemicals, Incorporated. Granule containing physiologically-active substance, method for preparing same and use thereof. 4,713,245, Cl. 424-438.000.

Ando, Yujiro: *See—*
Taniguchi, Osamu; Okada, Shinjiro; and Ando, Yujiro, 4,712,878, Cl. 350-350.00S.

Andolfi, Ceasar P.: *See—*
DePasquale, John A.; Segalowitz, Ivar R.; and Andolfi, Ceasar P., 4,712,359, Cl. 53-460.000.

Andre, Jean-Daniel; Grossi, Pierre-Jean; Heymes, Alain; and Manzaroli, Giovanni V., to SANOFI and Industria Chimica Prodotti FRANCIS S.p.A. Process for preparing α-hydroxy-alkanoic acids and compounds obtained by this process. 4,713,485, Cl. 562-470.000.

Andrew Corporation: *See—*
Dyott, Richard B., 4,712,866, Cl. 350-96.300.

Andrews, William H., to Comalco Aluminium Limited. Bauxite proppant. 4,713,203, Cl. 264-117.000.

Andrusch, Georg; Baisch, Joachim; Barsuhn, Horst; Wernicke, Friedrich C.; and Wiedmann, Siegfried K., to International Business Machines Corporation. Stability testing of semiconductor memories. 4,713,814, Cl. 371-21.000.

Angelillo, Domenico, to Industrie Magneti Marelli S.r.l. Pneumatic valve for braking systems. 4,712,577, Cl. 137-270.000.

**Anger, Wilhelm.** Temple end piece for a temple of a spectacle frame. 4,712,893, Cl. 351-123.000.

**Angus, James E.** Load-out construction device. 4,712,664, Cl. 193-17.000.

**Anno, Nobuo;** and Arai, Takeo, to Honda Giken Kogyo Kabushiki Kaisha. Cylinder block structure for multicylinder internal combustion engines. 4,712,517, Cl. 123-41.740.

**ANT Nachrichtentechnik GmbH:** *See*—
Guttner, Eckhard, 4,713,688, Cl. 358-141.000.

**Antolini, Adriano;** Morigi, Rodolfo; and Saviotti, Giancarlo. Cover, particularly for vehicle seats. 4,712,832, Cl. 297-180.000.

**Antonelli, Douglas C.;** Branscomb, Patricia M.; Broockman, Eric C.; Dickson, LeRoy D.; Koppel, Caralee P.; Osowski, Richard; and Stokes, Olen L., Jr., to International Business Machines Corporation. Method of inhibiting processing of duplicative coded label signals. 4,713,785, Cl. 364-569.000.

**Antonicelli, Marc:** *See*—
Metz, Pierre; and Antonicelli, Marc, 4,712,747, Cl. 244-3.220.

**Antos, John M.;** and Selina, John R., to Thetford Corporation. Portable toilet with valve actuating handle that automatically locks the valve in closed position during emptying of the holding tank. 4,712,255, Cl. 4-323.000.

**Anzai, Katsushi;** Harada, Osamu; Suematsu, Toshio; and Takeda, Yuji, to Toyota Jidosha Kabushiki Kaisha. Method and apparatus for controlling air-fuel ratio in internal combustion engine. 4,712,522, Cl. 123-179.00L.

**Anzai, Shunju;** Sasaki, Hiromu; Kunikawa, Norihide; and Ohgita, Kazuyuki, to Sharp Kabushiki Kaisha. Document size detection apparatus. 4,713,550, Cl. 250-560.000.

**Ao, Hideki;** Obata, Minoru; Yamanaka, Tsutomu; and Mikashima, Hiroshi, to Yoshitomi Pharmaceutical Industries, Ltd. Oxodiazine compounds and pharmaceutical compositions thereof. 4,713,381, Cl. 514-222.000.

**Aoi, Toshiki:** *See*—
Namba, Kenryo; Asami, Shigeru; Aoi, Toshiki; Takahashi, Kazuo; and Kuroiwa, Akihiko, 4,713,314, Cl. 430-270.000.

**Aoki, Kaoru:** *See*—
Ogawa, Takayuki; Ito, Hideaki; Kimura, Naokazu; Ito, Hayami; Tatsumi, Shuhei; Takao, Shoichi; Suzuki, Nitaro; Watanabe, Takashi; Shinano, Kunizo; Kuwabara, Takashi; and Aoki, Kaoru, 4,712,742, Cl. 241-20.000.

**Aoki, Kazumi;** and Fujiu, Minoru, to Sanden Corporation. Refrigerating unit for vending machine. 4,712,385, Cl. 62-333.000.

**Aono, Toshiaki;** and Hara, Hiroshi, to Fuji Photo Film Co., Ltd. Heat developable photosensitive material. 4,713,319, Cl. 430-567.000.

**Aoyama, Akimasa;** Moritani, Takeshi; Yonezu, Kiyoshi; Negi, Taichi; and Okaya, Takuji, to Kuraray Co., Ltd. Laminate having good gas barrier properties with barrier layer of modified ethylene-vinyl alcohol copolymer. 4,713,296, Cl. 428-412.000.

**AP Industries, Inc.:** *See*—
Peele, Camille; Harwood, Jon W.; and Resuggan, Peter L., 4,712,295, Cl. 29-700.000.

**Aqua-Chem Inc.:** *See*—
Schneider, Burnett M., 4,713,195, Cl. 252-180.000.

**Aquafine Corporation:** *See*—
Iannicelli, Joseph, 4,713,225, Cl. 423-230.000.

**Arai, Hisahiro:** *See*—
Sasaki, Nobuyoshi; Baba, Susumu; and Arai, Hisahiro, 4,712,605, Cl. 164-516.000.

**Arai, Mitsuru:** *See*—
Yoshida, Toshiyuki; and Arai, Mitsuru, 4,712,377, Cl. 60-444.000.

**Arai, Naoto,** to Kanzaki Paper Mfg. Co., Ltd. Heat-sensitive recording material. 4,713,364, Cl. 503-209.000.

**Arai, Takeo:** *See*—
Anno, Nobuo; and Arai, Takeo, 4,712,517, Cl. 123-41.740.

**Arakawa, Satoshi;** and Nonomura, Masamitu, to Fuji Photo Film Co., Ltd. Radiation image storage panel. 4,713,549, Cl. 250-484.100.

**Arakawa, Yoshio:** *See*—
Yokoyama, Kazumasa; Fukaya, Chikara; Tsuda, Yoshio; Ono, Taizo; Arakawa, Yoshio; and Suyama, Tadakazu, 4,713,459, Cl. 546-150.000.

**Araseki, Takashi,** to NEC Corporation. System for simultaneously coding and decoding a plurality of signals. 4,713,776, Cl. 364-513.500.

**Ardrox Inc.:** *See*—
Schiller, Harold, 4,713,144, Cl. 156-656.000.

**Aretz, Werner;** Berscheid, Hans G.; Huber, Gerhard; Fehlhaber, Hans-Wolfram; Kraemer, Hans P.; Sedlacek, Hans-Harald; Ganguli, Bimal N.; Sood, Ratan S.; Gandhi, Julia; and Reddy, Gauknapalli C., to Hoechst Aktiengesellschaft. Anthracycline derivatives and their use as cytostatics. 4,713,371, Cl. 514-34.000.

**Ariizumi, Ryozo;** and Ejiri, Takashi, to Fujikura Rubber Limited. Pneumatically operated valve. 4,712,576, Cl. 437-270.000.

**Arima, Takemi:** *See*—
Morishita, Akira; Okamoto, Kyoichi; Nakagawa, Taiichi; Morikane, Hiroyuki; Hasegawa, Akinori; Arima, Takemi; and Kounou, Tadami, 4,712,451, Cl. 74-801.000.

**Arito, Tatsunari;** and Tojo, Yu, to Fuji Photo Film Co., Ltd. Method of preventing the occurrence of blackened margins on photosensitive sheets in electrophotography. 4,712,905, Cl. 355-3.0CH.

**Armbruster, David R.;** and Johnson, Calvin K., to Acme Resin Corporation. Foundry shell core and mold composition. 4,713,294, Cl. 428-404.000.

**Armor, John N.:** *See*—
Marsh, Gary B.; Fanelli, Anthony J.; Armor, John N.; and Zambri, Patrick M., 4,713,233, Cl. 423-608.000.

**Armstrong World Industries, Inc.:** *See*—
Bohrn, Walter J.; Lewis, Robert D.; and Moggio, William A., 4,713,084, Cl. 8-561.000.

**Arndt, Michael;** and Sehnem, Hans P., to Bayer Aktiengesellschaft. Process for the preparation of alkylthioacetamidines. 4,713,490, Cl. 564-225.000.

**Arnold, Herbert;** Horbelt, Michael; and Jundt, Werner, to Robert Bosch GmbH. Method and apparatus for replacement of data and of a data memory in an automotive-type electronic control system. 4,713,812, Cl. 371-10.000.

**Arold, Klaus;** Grimm, Hermann, deceased (by Grimm, Christel, executrix); and Koukal, Heinz, to Daimler-Benz Aktiengesellschaft. Heat exchanger for the independent heating of the driver and front-seat passenger side of a motor vehicle. 4,712,608, Cl. 165-41.000.

**Arrendieli, Robert;** and Ellis, Gwendolyn E. Nested plastic extension slide. 4,712,927, Cl. 384-23.000.

**Aruga, Tamotsu:** *See*—
Shimada, Masaru; Kawanishi, Toshiyuki; Murakami, Kakuji; Aruga, Tamotsu; and Uemura, Hiroyuki, 4,713,113, Cl. 106-22.000.

**Arutjunian, Norair S.;** Kornena, Elena P.; Kazarian, Robert V.; Ponomareva, Natalya A.; Redko, Grigory V.; Sakhno, Lidia T.; and Zhidkova, Irina S., to Krasnodarsky Politekhnichesky Institut. Method for preparation of phosphatide concentrates from vegetable oils. 4,713,155, Cl. 204-155.000.

**Asahi Kasei Kogyo Kabushiki Kaisha:** *See*—
Aikou, Kenichi; Kurihara, Yoichi; and Goto, Tsugio, 4,712,477, Cl. 102-206.000.

**Asahi, Naotatsu:** *See*—
Sunano, Naomasa; Asahi, Naotatsu; and Yoshida, Toshio, 4,713,646, Cl. 338-34.000.

**Asami, Shigeru:** *See*—
Namba, Kenryo; Asami, Shigeru; Aoi, Toshiki; Takahashi, Kazuo; and Kuroiwa, Akihiko, 4,713,314, Cl. 430-270.000.

**Asano, Isao,** to Alps Electric Co., Ltd. Information recording and reproducing apparatus. 4,713,703, Cl. 360-97.000.

**Asano, Masao;** Isobe, Ryosuke; Yamauchi, Yasuhisa; and Yamagishi, Hiroaki, to Konishiroku Photo Industry Co., Ltd. Magnetic recording media. 4,713,293, Cl. 428-403.000.

**Asano, Toshiaki:** *See*—
Kato, Masatake; Tsuji, Sadahiko; and Asano, Toshiaki, 4,712,883, Cl. 350-427.000.

**Ashley, Bruce W.:** *See*—
Hoover, Gary W.; Empson, Geuane; and Ashley, Bruce W., 4,712,326, Cl. 43-42.310.

**ASM Fico Tooling, b.v.:** *See*—
Fierkens, Richardus H. J.; and Pas, Ireneus J. T. M., 4,712,994, Cl. 425-543.000.

**Aso, Hideo;** Fujino, Hirohisa; and Saibe, Seiichi, to Tokyo Juki Industrial Co., Ltd. Button sewing machine. 4,712,493, Cl. 112-112.000.

**Association Generale de Producteurs de Mais:** *See*—
Cornet, Michel; and Michel, Pierre, 4,712,362, Cl. 56-16.500.

**Astarni Pty. Ltd.:** *See*—
Wenham, Bruce T.; Cook, Raymond; and Hunter, Clifford R., 4,712,339, Cl. 52-173.0PS.

**AT&T Bell Laboratories:** *See*—
Kimball, David B.; and Kip, Ruloff F., Jr., 4,713,564, Cl. 307-542.100.

**Ateliers de Constructions Electriques de Charleroi:** *See*—
Plumier, Michel, 4,713,212, Cl. 376-258.000.

**Ateliers Rolland S.A.:** *See*—
Cornet, Michel; and Michel, Pierre, 4,712,362, Cl. 56-16.500.

**Atlantic Richfield Company:** *See*—
Wolcott, Herbert A.; and McHaney, James H., 4,712,579, Cl. 137-375.000.

**Atochem:** *See*—
Ganga, Roland A., 4,713,139, Cl. 156-500.000.

**Atsumi, Morihiro:** *See*—
Yamada, Manabu; Yoshida, Ichirou; Yamaguchi, Shunzo; and Atsumi, Morihiro, 4,713,582, Cl. 315-58.000.

**Attoe, Gary N.:** *See*—
Abel, Kent W.; and Attoe, Gary N., 4,713,132, Cl. 156-73.100.

**Attwood Corporation:** *See*—
Whitley, Warwick M., II, 4,712,501, Cl. 114-211.000.

**Atwood, Mark T.;** and Hall, Ronald H., to VerTech Treatment Systems, Inc. Process for mitigating scale formation in tube reaction apparatus. 4,713,177, Cl. 210-697.000.

**Augendre, Claude;** Rapidel, Jean-Loup; and Hennes, Jacques, to Facom. Wheel balancing machine, particularly for automobile wheels. 4,712,425, Cl. 73-460.000.

**Augustin, Harald.** Apparatus for the measurement of surface friction. 4,712,418, Cl. 73-9.000.

**Automotive Products plc:** *See*—
Leigh-Monstevens, Keith V.; and Mienko, David K., 4,712,640, Cl. 180-336.000.

**Avco Corporation:** *See*—
Dickey, Thomas A.; and Bodetka, George R., 4,712,372, Cl. 60-39.281.

**Avery International Corporation:** *See*—
Freedman, Melvin S., 4,713,273, Cl. 428-40.000.

**Avny, Eli,** to Sundstrand Corporation. Apparatus for limiting differential rotation. 4,712,449, Cl. 74-710.500.

**Avondale Mills:** *See*—
Lindsey, James N., 4,712,290, Cl. 28-178.000.

**Awano, Yoshiyuki;** and Narita, Hiroshi, to Du Pont de Nemours, E. I., and Company. Connector unit. 4,713,020, Cl. 439-267.000.

Axytel: *See*—
Levavasseur, Jean R., 4,712,489, Cl. 109-25.000.

Ayabe, Youzou; and Sugiyama, Shigeru. Containers for beverages. 4,712,702, Cl. 220-90.200.

Ayata, Naoki, to Canon Kabushiki Kaisha. Alignment apparatus. 4,713,784, Cl. 364-559.000.

B. F. Goodrich Company, The: *See*—
Kim, Heung-Tai, 4,712,992, Cl. 425-207.000.
Kugelman, Michael M., 4,713,719, Cl. 361-54.000.

Baba, Susumu: *See*—
Sasaki, Nobuyoshi; Baba, Susumu; and Arai, Hisahiro, 4,712,605, Cl. 164-516.000.

Baba, Takeshi; Imataki, Hiroyuki; Usui, Masayuki; Serizawa, Takashi; and Nose, Hiroyasu, to Canon Kabushiki Kaisha. Variable focal length lens. 4,712,882, Cl. 350-413.000.

Babaian, Eduard A.; Gerasimova, Galina A.; Davydov, Anatoly B.; Utyamyshev, Rustam I.; Khromov, Gennady L.; Metelitsa, Vladimir I.; Vikhert, Anatoly M.; Savvateev, Konstantin L.; Piotrovsky, Vladimir K.; and Novikova, Elizaveta B., to Vsesojuny Kardiologichesky Nauchny Tsentr Adkaemii Meditsinski Nauk SSSR; and Vsesojuzny Nauchno-Issledovatelsky I Ispytateiny Institut Meditsinskoi Tekhniki. Antianginal film and method of treating ischemic heart disease. 4,713,239, Cl. 424-81.000.

Babel, Wolfgang, to Diehl GmbH & Co. Mine with alarm and triggering sensors. 4,712,479, Cl. 102-427.000.

Bachel, Ernst; and Giebel, Wolfgang, to Siemens Aktiengesellschaft. Longitudinally divided sleeve of shrinkable material. 4,713,272, Cl. 428-36.000.

Backer, Bruce E. Interconnecting "full bleed" modular panel and connective hardware system to form a variety of exhibit and office interior enclosures. 4,712,336, Cl. 52-71.000.

Baer, James W., to Dazar Corporation. Optical system for fast access optical data storage device. 4,712,887, Cl. 350-484.000.

Bagga, Madan M.; and Bull, Christopher H., to Ciba-Geigy Corporation. Solid solution of amine and polymerized phenol. 4,713,432, Cl. 526-313.000.

Baggio, Giorgio, to Nordica S.p.A. Ski boot with a device for securing the foot of the skier. 4,712,316, Cl. 36-119.000.

Baginski, Pierre; and Nebon, Jean-Pierre, to Merlin Gerin. Circuit breaker operating mechanism equipped with a stored energy system having removable and replaceable closing spring mechanisms. 4,713,508, Cl. 200-153.0SC.

Baier, Alfred S. Pipe stem replacement kit. 4,712,569, Cl. 131-328.000.

Baika, Toyokazu; and Oonaka, Hidemi, to Toyota Jidosha Kabushiki Kaisha. Lubricating mechanism for a rotary machine. 4,712,442, Cl. 74-467.000.

Bailey, Philip E.; Pickett, Gordon E.; Luttinger, Manfred; and Umeda, Takashi, to Idemitsu Petrochemical Co., Ltd. Flame retardant polyester resin composition. 4,713,407, Cl. 524-109.000.

Baisch, Joachim: *See*—
Andrusch, Georg; Baisch, Joachim; Barsuhn, Horst; Wernicke, Friedrich C.; and Wiedmann, Siegfried K., 4,713,814, Cl. 371-21.000.

Baker, James K., to Exxon Research and Engineering Company. Speech recognition method. 4,713,778, Cl. 364-513.500.

Baker, Rodney G.: *See*—
Lubelski, Daniel P.; and Baker, Rodney G., 4,713,359, Cl. 501-63.000.

Baker, Ross G., Jr., to Intermedics, Inc. Pacemaker and method for ventricular rate limit operation and termination of pacemaker mediated tachycardia. 4,712,556, Cl. 128-419.0PG.

Bakow, Leon: *See*—
Sparling, Kenneth P.; Incardona, Angelo; Kikendall, Garth D.; Richardson, David G.; Wood, Ronald E.; and Bakow, Leon, 4,712,958, Cl. 411-506.000.

Balazs, Endre A.; Leshchiner, Adolf; Leshchiner, Adelya; and Band, Philip, to Biomatrix, Inc. Chemically modified hyaluronic acid preparation and method of recovery thereof from animal tissues. 4,713,448, Cl. 536-55.100.

Ball Corporation: *See*—
Lewis, Lindon L., 4,712,444, Cl. 74-479.000.

Ballmoos, Roland V.: *See*—
Derouane, Eric G.; and Ballmoos, Roland V., 4,713,227, Cl. 423-305.000.

Ban, Takao: *See*—
Ohno, Sachio; Ebihara, Yuko; Mizukoshi, Kiyoshi; Ichihara, Kenji; Ban, Takao; and Nagasaka, Mitsuaki, 4,713,457, Cl. 546-67.000.

Banba, Nobuo: *See*—
Funato, Hiroyoshi; and Banba, Nobuo, 4,712,852, Cl. 350-371.000.

Band, Philip: *See*—
Balazs, Endre A.; Leshchiner, Adolf; Leshchiner, Adelya; and Band, Philip, 4,713,448, Cl. 536-55.100.

Bandelow, Vernon D.: *See*—
Brizgis, Lawrence J.; Keleher, Daniel B.; and Bandelow, Vernon D., 4,713,781, Cl. 364-552.000.

Bander, Neil H.; Whitmore, Willet F.; and Old, Lloyd J., to Sloan-Kettering Institute for Cancer Reseach. Monoclonal antibody panel for early diagnosis and therapy of renal carcinoma. 4,713,352, Cl. 436-548.000.

Banerjee, Sanjay K.: *See*—
Womack, Richard H.; Banerjee, Sanjay K.; Shichijo, Hisashi; and Malhi, Satwinder, 4,713,678, Cl. 357-23.600.

Barabas, Eugene S., to GAF Corporation. Water soluble complex of a poly (vinyl lactam) and chlorothiazide and process for producing same. 4,713,238, Cl. 424-80.000.

Barbrick, August: *See*—
Mobley, Dewey F.; Warren, Janice M.; Barbrick, August; and Eisenmann, Gregg A., 4,713,026, Cl. 439-845.000.

Bard, William B.: *See*—
Funk, Gary L.; and Bard, William B., 4,713,774, Cl. 364-500.000.

Bardsley, Frank B.; and Sycha, Alec B., to Gearhart Tesel Limited. Connector apparatus. 4,712,846, Cl. 439-33.000.

Bareket, Noah, to Lockheed Missles & Space Company, Inc. Linear-scanned-array wavefront sensor. 4,712,913, Cl. 356-121.000.

Baril, Michel: *See*—
Drabowitch, Serge; Baril, Michel; and Le Parquier, Guy, 4,713,663, Cl. 342-70.000.

Barkdull, Howard L., Jr. Method of span construction. 4,712,335, Cl. 52-2.000.

Barker, Sidney A.; and Somers, Peter J., to Imperial Chemical Industries PLC. Solubilization and hydrolysis of carbohydrates. 4,713,118, Cl. 127-38.000.

Barl, Manfred: *See*—
Pilz, Georg; Buerger, Gert; Barl, Manfred; and Thiel, Gerhard, 4,713,201, Cl. 260-501.170.
Pilz, Georg; Buerger, Gert; Barl, Manfred; and Thiel, Gerhard, 4,713,437, Cl. 528-336.000.

Barnert, Heiko: *See*—
Weirich, Walter; Barnert, Heiko; Oertel, Michael; and Schulten, Rudolf, 4,713,234, Cl. 423-648.00R.

Barnum, Lewis W.: *See*—
Gaskill, Garold B.; Park, Daniel J.; Rullman, Robert G.; Rose, Donald T.; Stiley, Joseph F., III; Barnum, Lewis W.; and Hoff, Don G., 4,713,808, Cl. 370-94.000.

Baron, Neville A. Process for recurving the cornea of an eye. 4,712,543, Cl. 128-303.100.

Barratt, Craig H.; Wilfley, Brian P.; and Parish, David M., to Resonex, Inc. Quantization error reduction method for phase encode gradient in NMR imaging. 4,713,615, Cl. 324-307.000.

Barre, Maurice; and Kalewicz, Zdzislaw. Pigmentary composition for the cathodic protection of metallic surfaces against corrosion, and process for preparing said composition. 4,713,112, Cl. 106-14.050.

Barrett, Robert C., to Eastman Machine Company. Straight knife machine with safety features. 4,712,303, Cl. 30-275.000.

Barsuhn, Horst: *See*—
Andrusch, Georg; Baisch, Joachim; Barsuhn, Horst; Wernicke, Friedrich C.; and Wiedmann, Siegfried K., 4,713,814, Cl. 371-21.000.

Bartels, Inske E. H.: *See*—
Tolksdorf, Wolfgang F. M.; Bartels, Inske E. H.; Dammann, Hans O. B.; Klages, Claus-Peter; and Pross, Elke B., 4,712,855, Cl. 350-96.120.

Barteis-Keith, Dorothy F., executrix: *See*—
Bartels-Keith, James R., deceased; Puttick, Anthony J.; and Taylor, Lloyd D., 4,713,313, Cl. 430-251.000.

Bartels-Keith, James R., deceased (by Bartels-Keith, Dorothy F., executrix); Puttick, Anthony J.; and Taylor, Lloyd D., to Polaroid Corporation. Photographic system and novel compounds. 4,713,313, Cl. 430-251.000.

BASF Aktiengesellschaft: *See*—
Kerth, Juergen; and Vogt, Heinz, 4,713,430, Cl. 526-159.000.
Merger, Franz; and Towae, Friedrich, 4,713,476, Cl. 560-115.000.
Osterloh, Rolf; Schupp, Eberhard; Loch, Werner; and Ahlers, Klaas, 4,713,440, Cl. 528-367.000.
Pilz, Georg; Buerger, Gert; Barl, Manfred; and Thiel, Gerhard, 4,713,201, Cl. 260-501.170.
Pilz, Georg; Buerger, Gert; Barl, Manfred; and Thiel, Gerhard, 4,713,437, Cl. 528-336.000.
Schupp, Eberhard; Osterloh, Rolf; Loch, Werner; and Ahlers, Klaas, 4,713,406, Cl. 523-415.000.

Basnett, David T., to Die-Mold Tool Ltd.; and Mold-Masters Limited. Replaceable rocker arm assembly for injection molding system. 4,712,995, Cl. 425-562.000.

Battelle Memorial Institute: *See*—
Gonzalez Oliver, Carlos J. R.; De Pous, Olivier; and Schneider, Michel, 4,713,338, Cl. 435-176.000.

Baum, Allen: *See*—
Worley, William S., Jr.; Bryg, William R.; and Baum, Allen, 4,713,755, Cl. 364-200.000.

Baum, Samuel; and Yaeger, John R., to Raychem Corporation. Low loss circuit breaker and actuator mechanism therefor. 4,713,643, Cl. 337-140.000.

Baumann, John A.: *See*—
Michel, Christian G.; Schachter, Rozalie; Kuck, Mark A.; Baumann, John A.; and Raccah, Paul M., 4,713,192, Cl. 252-62.30R.

Bausch & Lomb Incorporated: *See*—
Bawa, Rajan; and Deichert, William G., 4,713,244, Cl. 424-429.000.
Dobner, Michael H., 4,712,890, Cl. 350-530.000.

Bawa, Rajan; and Deichert, William G., to Bausch & Lomb Incorporated. Sustained-release formulation containing an amino acid polymer with a lower alkyl ($C_1$–$C_4$) polar solvent. 4,713,244, Cl. 424-429.000.

Baxter Travenol Laboratories: *See*—
Hsu, Li-chien; and Heitzmann, Hal, 4,712,865, Cl. 350-96.290.

Baxter Travenol Laboratories, Inc.: *See*—
Gianfilippo, Aleandro Di, 4,712,590, Cl. 141-83.000.
Link, William T., 4,712,563, Cl. 128-681.000.

Bayer Aktiengesellschaft: *See*—
Arndt, Michael; and Sehnem, Hans P., 4,713,490, Cl. 564-225.000.
Elbe, Hans-Ludwig; and Holmwood, Graham, 4,713,456, Cl. 544-335.000.

Kramer, Wolfgang; Weissmuller, Joachim; Reiser, Wolf; Berg, Dieter; Brandes, Wilhelm; and Reinecke, Paul, 4,713,379, Cl. 514-212.000.
Kress, Hans-Jurgen; and Kircher, Klaus, 4,713,462, Cl. 548-473.000.
Salzburg, Herbert; Hajek, Manfred; Hagemann, Hermann; Kuhle, Engelbert; Fuhrer, Wolfgang; Hanssler, Gerd; Brandes, Wilhelm; and Reinecke, Paul, 4,713,389, Cl. 514-373.000.
Schittenhelm, Hans-Joachim; Joseph, Werner; and Trogel, Gerhard, 4,713,530, Cl. 219-543.000.

Bayerische Motoren Werke Aktiengesellschaft: *See*—
Stamm, Wolfgang; and Konig, Dieter, 4,712,289, Cl. 29-568.000.

Baylor College of Medicine: *See*—
Garson, Arthur, Jr., 4,712,554, Cl. 128-419.0PG.

Bayol, Alain; Blanc, Francis; Lansen, Jacqueline; Maffrand, Jean-Pierre; and Pereillo, Jean-Marie, to Sanofi S.A. Xylan sulfates of low molecular weight, process for their preparation and medicaments containing them. 4,713,373, Cl. 514-54.000.

Beasom, James D., to Harris Corporation. Structure for high breakdown PN diode with relatively high surface doping. 4,713,681, Cl. 357-52.000.

Bebber, Hans J.; Neuschutz, Dieter; and Rossner, Heinrich-Otto, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Method and apparatus for holding or increasing the temperature in a metal melt. 4,713,826, Cl. 373-22.000.

Beck, Walter; Berger, Siegfried; and Werner, Margrit, to Beck, Walter; and Werner, Margrit. Apparatus for aspirating secreted fluids from a wound. 4,713,052, Cl. 604-48.000.

Becker, Carl, to Ciba-Geigy Corporation. Stable aqueous dyestuff preparations of finely dispersed water-insoluble or sparingly water-soluble dyes. 4,713,081, Cl. 8-527.000.

Becker, Michael; and Renz, Klaus, to Siemens Aktiengesellschaft. Monitoring device for detecting faults in an electrical device, particularly in an LC filter circuit in an AC voltage network. 4,713,604, Cl. 324-500.000.

Becton, Dickinson and Company: *See*—
Riuli, Arduino; E., 4,713,060, Cl. 604-199.000.
Solomon, Donald D., 4,713,402, Cl. 523-112.000.

Bedeschi, Angelo: *See*—
Alpegiani, Marco; Bedeschi, Angelo; Foglio, Maurizio; Franceschi, Giovanni; and Perrone, Ettore, 4,713,450, Cl. 540-214.000.

Beebe, William B. Pendulum type decorative and time indicating device. 4,712,925, Cl. 368-179.000.

Beecham Group p l.c.: *See*—
Buckle, Derek R., 4,713,486, Cl. 562-495.000.

Beggs, Louis C.: *See*—
Pejouhy, Radi; Nield, Joseph G., Jr.; D'Entremont, John R.; Beggs, Louis C.; and Rotulo, Fabrizio, 4,713,717, Cl. 361-26.000.

Begum, Selima; Ullah, Ismat; and Nunning, Bernard C., to Bristol-Myers Company. Etoposide oral dosage form. 4,713,246, Cl. 424-455.000.

Beh-Forrest, Eric; and Flanagan, Thomas P., to National Starch and Chemical Corporation. Hot melt adhesive composition for book hinge joint. 4,712,808, Cl. 281-15.00R.

Behringwerke Aktiengellschaft: *See*—
Stuber, Werner, 4,713,369, Cl. 514-18.000.

Beigang, Wolfgang; and Hoffman, Werner, to Uni-Cardan Aktiengesellschaft. Torque transmission assembly with enhanced torque transmitting characteristics. 4,713,040, Cl. 464-132.000.

Beirnes, James R. Weatherstripping for side-hinged windows and doors. 4,712,330, Cl. 49-484.000.

Bell Communications Research, Inc.: *See*—
Albanese, Andres; and Cheng, Steven S., 4,712,859, Cl. 350-96.160.

Belt, Kenneth W.: *See*—
Schaefer, Daniel J.; and Belt, Kenneth W., 4,712,560, Cl. 128-653.000.

Bendix France: *See*—
Blot, Jean-Claude, 4,712,468, Cl. 91-376.00R.
Carre, Jean-Jacques, 4,712,840, Cl. 303-24.00R.
Kervagoret, Gilbert, 4,712,631, Cl. 180-143.000.
Kervagoret, Gilbert, 4,712,632, Cl. 180-143.000.
Sauvee, Jean-Paul, 4,712,655, Cl. 188-196.00D.

Benfaremo, Nicholas: *See*—
Nalesnik, Theodore E.; and Benfaremo, Nicholas, 4,713,189, Cl. 252-51.50A.

Berchem, Rutger; and Proksch a, Georg, to Berchem & Schaberg GmbH. Excavator tooth for earth moving equipment. 4,712,321, Cl. 37-142.00R.

Berchem & Schaberg GmbH: *See*—
Berchem, Rutger; and Proksch a, Georg, 4,712,321, Cl. 37-142.00R.

Berg, Dieter: *See*—
Kramer, Wolfgang; Weissmuller, Joachim; Reiser, Wolf; Berg, Dieter; Brandes, Wilhelm; and Reinecke, Paul, 4,713,379, Cl. 514-212.000.

Berg, Roger M.; and Scott, Francis H., to UNI-BMX, Inc. Demountable disc covers for spoked wheels. 4,712,838, Cl. 301-37.0SA.

Berger, Abe: *See*—
Harris, James E.; Berger, Abe; Chopdekar, Vilas M.; Matzner, Markus; and Spanswick, James, 4,713,438, Cl. 528-337.000.

Berger, Siegfried: *See*—
Beck, Walter; Berger, Siegfried; and Werner, Margrit, 4,713,052, Cl. 604-48.000.

Bergmann, Friedhelm: *See*—
Herwig, Jens; Norenberg, Hagen; Bergmann, Friedhelm; Stiller, Manfred; Schlemmermeyer, Horst; Schmidt, Wilfried; Straube, Hilmar; and Wolter, Helmut, 4,712,434, Cl. 73-864.630.

Bergstrom, James W.; and Podgorski, Theodore J., to Honeywell Inc. Readout for a ring laser gyro. 4,712,917, Cl. 356-350.000.

Berke, Joseph J.: *See*—
Presser, Dwight W.; and Berke, Joseph J., 4,713,002, Cl. 433-30.000.

Bersch, Bernhard; Juttner, Heinz; and Tenhaven, Ulrich, to Hoesch Aktiengesellschaft. Apparatus for laser beam welding the longitudinal edges of a can. 4,713,519, Cl. 219-121.0LC.

Berscheid, Hans G.: *See*—
Aretz, Werner; Berscheid, Hans G.; Huber, Gerhard; Fehlhaber, Hans-Wolfram; Kraemer, Hans P.; Sedlacek, Hans-Harald; Ganguli, Bimal N.; Sood, Ratan S.; Gandhi, Julia; and Reddy, Gauknapalli C., 4,713,371, Cl. 514-34.000.

Bertoglio, Guido, to Water Line S.A. Machine for filling bags with a liquid and sealing them. 4,712,360, Cl. 53-567.000.

Bertorello, Mario, to Rotomors S.p.A. Systems including at least one vertical turning machine or the like and at least two auxiliary stations. 4,712,283, Cl. 29-33.00P.

Besam AB: *See*—
Norrgren, Bo; and Bjelk, Nils, 4,713,545, Cl. 250-338.000.

Besser Company: *See*—
Salts, Thomas R., 4,712,975, Cl. 414-786.000.

Beta Phase, Inc.: *See*—
Krumme, John F., 4,713,063, Cl. 604-250.000.

Bethell, Michael R.; Gaines, Michael G.; Mowat, James F., Jr.; Wheeler, Roger D.; and Woidke, Richard P., to Monroe Auto Equipment Company. Gas pressurized shock absorber assembly. 4,712,353, Cl. 53-80.000.

Bhasin, Anirudh K.: *See*—
Smit, Francis J.; Horst, William E.; and Bhasin, Anirudh K., 4,713,086, Cl. 44-51.000.

Bhattacharyya, Bhupati R.; and Dalsin, Philip D., to Nalco Chemical Company. High molecular weight DADMAC polymers by inverse emulsion technology. 4,713,431, Cl. 526-207.000.

Bickelhaupt, Roger; and Roid, Michael D., to American Hospital Supply Corporation. Dispenser for an elongated flexible member. 4,713,059, Cl. 604-171.000.

Biedermann, Adam, to Joh. Winklhofer & Sohne. Chain tensioner. 4,713,043, Cl. 474-111.000.

Bielka, Robert P.: *See*—
Kelly, L. Thomas; Hamel, Esther V. M.; and Bielka, Robert P., 4,713,054, Cl. 604-89.000.

Bihn, Raymond J., to Champion Spark Plug Company. Spray gun nozzle assembly retainer clip and spray gun nozzle assembly. 4,712,739, Cl. 239-290.000.

Bilco Tools Inc.: *See*—
Coyle, William E., Sr.; and Penisson, Dennis J., 4,712,284, Cl. 29-240.000.

Billon, Michel: *See*—
Chaveron, Henri; Pontillon, Jean; Billon, Michel; Adenier, Herve ; and Kamoun, Ahmed, 4,713,256, Cl. 426-631.000.

Bily, Robert R. Starter cultures of improved activity for dairy products and process of making same. 4,713,341, Cl. 435-253.000.

Bio Medical Research Ltd.: *See*—
Kidd, Geoffrey; Maher, Daniel V.; and Cywinski, Jozef, 4,712,558, Cl. 128-421.000.

Biomatrix, Inc.: *See*—
Balazs, Endre A.; Leshchiner, Adolf; Leshchiner, Adelya; and Band, Philip, 4,713,448, Cl. 536-55.100.

Biotrack, Inc.: *See*—
Allen, Jimmy D.; Cobb, Michael E.; Hillman, Robert S.; Mungall, Dennis R.; Ostoich, Vladimir E.; and Stroy, Gary H., 4,712,460, Cl. 83-208.000.

Birkenbach, Eugen J.; Eversole, Brad K.; and Magee, Kevin J., to J. I. Case Company. Self-leveling agricultural implement. 4,712,622, Cl. 172-328.000.

Birum, Gail H.; and Jansen, Richard F., to Akzo America Inc. Preparation of N-substituted arylsulfonamides. 4,713,489, Cl. 564-90.000.

Bissel, Steve F. Waterbed and holder assembly for use therewith. 4,712,260, Cl. 5-451.000.

Bisson, Flavio, to Necchi Societa per Azioni. Automatic exchange of the size in an automatic sewing unit. 4,712,494, Cl. 112-121.120.

Bixler, Craig A.; and Triner, Irvin R., to Molex Incorporated. Electrical connector and method of assembly. 4,713,023, Cl. 439-393.000.

Bjelk, Nils: *See*—
Norrgren, Bo; and Bjelk, Nils, 4,713,545, Cl. 250-338.000.

Black, Jimmy C.: *See*—
Roberts, Bruce E.; Black, Jimmy C.; and Matlock, Dyer A., 4,713,260, Cl. 437-238.000.

Blackham, Ray, to Hewlett-Packard Company. Method and apparatus for measuring a transfer function. 4,713,782, Cl. 364-553.000.

Blade, Robert J., to Burroughs Wellcome Co. Pesticidal compounds. 4,713,200, Cl. 260-408.000.

Blanc, Francis: *See*—
Bayol, Alain; Blanc, Francis; Lansen, Jacqueline; Maffrand, Jean-Pierre; and Pereillo, Jean-Marie, 4,713,373, Cl. 514-54.000.

Blanchette, Ronald L.: *See*—
Percivalle, Glenn S.; and Blanchette, Ronald L., 4,712,457, Cl. 82-47.000.

Blankers, Johannes M. M.: *See*—
Scholten, Gerard J.; Dieleman, Louis F. A.; and Blankers, Johannes M. M., 4,712,675, Cl. 206-332.000.

Blaser, Hansueli: *See*—
Lodetti, Attilio; and Blaser, Hansueli, 4,712,288, Cl. 29-557.000.

Blaser, Peter: *See*—
Rodi, Anton; and Blaser, Peter, 4,713,593, Cl. 318-572.000.

Blezard, Robert C.: *See*—
Evans, Robert D.; and Blezard, Robert C., 4,713,130, Cl. 156-72.000.

Blitz, Hans-Dieter: *See*—
Sutterlin, Norbert; Blitz, Hans-Dieter; Mager, Theodor; Jagsch, Karl-Heinz; and Tessmer, Dieter, 4,713,434, Cl. 526-62.000.

Bloom, William G.: *See*—
Gille, Henrick K.; Willing, Richard S.; Bloom, William G.; Siegel, Bernard; Cheung, Tsang; Lobodzinski, Richard; and Gilroy, Keith, 4,712,567, Cl. 128-771.000.

Blot, Jean-Claude, to Bendix France. Distribution valve assembly for a pneumatic brake booster. 4,712,468, Cl. 91-376.00R.

Blum, Albert. Ground effect vehicle. 4,712,630, Cl. 180-117.000.

Bobst SA: *See*—
Morisod, Jean-Bernard, 4,713,831, Cl. 377-8.000.

BOC Group, Inc., The: *See*—
Tamhankar, Satish; and Weltmer, William R., 4,713,224, Cl. 423-219.000.

Bock, Erich; and Rieger, Gerald, to Diehl GmbH & Co. Projectile with active components. 4,712,482, Cl. 102-501.000.

Bodetka, George R.: *See*—
Dickey, Thomas A.; and Bodetka, George R., 4,712,372, Cl. 60-39.281.

Boebert, William E.; and Kain, Richard Y., to Honeywell Inc. Secure data processing system architecture with format control. 4,713,753, Cl. 364-200.000.

Boeckmann, Hugo, to Minigrip, Inc. Bag dispensing arrangement. 4,712,684, Cl. 206-554.000.

Boehm, Hans-Peter: *See*—
Langerbeins, Klaus; Schroder, Gunther; and Boehm, Hans-Peter, 4,713,483, Cl. 560-204.000.

Boeing Company, The: *See*—
Macdonald, Kenneth A. B., 4,712,465, Cl. 89-16.000.
Ridgwell, Robert H., 4,712,750, Cl. 244-117.00A.
Victor, Paul F., 4,712,752, Cl. 244-129.100.

Bogdanovic, Borislav; and Bonnemann, Helmut, to Studiengesellschaft Kohle mbH. Process for preparing finely divided metal powders. 4,713,110, Cl. 75-0.50A.

Boggs, Gary D.: *See*—
Steppe, Dennis L.; Hood, Larry L.; and Boggs, Gary D., 4,713,051, Cl. 604-30.000.

Bohrn, Walter J.; Lewis, Robert D.; and Moggio, William A., to Armstrong World Industries, Inc. Alginate gel particle inks or dye liquors for imparting color to textiles. 4,713,084, Cl. 8-561.000.

Bokowski, Gary A.; and Vahey, David W., to AccuRay Corporation. Ultrasonic transducers for on-line applications. 4,713,572, Cl. 310-323.000.

Bolt Technology Corporation: *See*—
Chelminski, Stephen V., 4,712,641, Cl. 181-113.000.

Bonacci, Stephen T.; Douville, Richard L.; and Winter, Rodger C. Screen door assembly. 4,712,598, Cl. 160-84.00R.

Bond, Michael E.; and Voreh, Fred R., to USM Corporation. Plastic wall anchor. 4,712,956, Cl. 411-55.000.

Bond, Raymond G.; and Mock, Gerald L., to Fortel Corporation. Telephone answering machine with automatic recording and visual display of time and data. 4,713,835, Cl. 379-79.000.

Boner, Heinrich: *See*—
Fullemann, Jorg; and Boner, Heinrich, 4,712,997, Cl. 431-89.000.

Bonnemann, Helmut: *See*—
Bogdanovic, Borislav; and Bonnemann, Helmut, 4,713,110, Cl. 75-0.50A.

Bonnet, Ludwig. Instrument for slitting stenoses in bodily passages. 4,712,547, Cl. 128-311.000.

Boone, Joseph E.; and Ahlemeyer, W. Bruce, to Regency Electronics, Inc. Transportation vehicle location monitor generating unique audible messages. 4,713,661, Cl. 340-994.000.

Boos, Donald L.; and Marse, Allan V., to Standard Oil Company. Double layer capacitor. 4,713,731, Cl. 361-433.000.

Booth, Llewellyn D.; and Cohen, Arie, to Dow Chemical Company, The. Process for reducing the distortion of multi-layered laminates. 4,713,202, Cl. 264-46.500.

Bor-es Cipoipari Kutato-Fejleszto Vallalat: *See*—
David, Dezso; Rovo, Peter; Sipos nee Richter, Terez; Molnar, Gyorgy; Deme, Istvan; and Karnitscher, Tamas, 4,713,078, Cl. 8-94.150.

Borenson, Henry. Teaching apparatus and method for solving algebraic linear equations. 4,713,009, Cl. 434-188.000.

Borg-Warner Corporation: *See*—
Haley, William J., 4,712,453, Cl. 74-866.000.

Borgman, Bradley N.; Cramer, Jerry W.; and Dossey, Don E., to Sunkist Growers, Inc. Vacuum manifold with quick connect-disconect latch assembly. 4,712,818, Cl. 294-64.100.

Borona, Russell T.: *See*—
Murphy, Glenn L.; Borona, Russell T.; and Gelzheiser, Francis L., 4,713,640, Cl. 335-194.000.

Bose, Bimal K.; and Szczesny, Paul M., to General Electric Company. Start-up control for switched reluctance motor. 4,713,594, Cl. 318-685.000.

Bose, Bimal K., to General Electric Company. Induction motor drive system. 4,713,596, Cl. 318-802.000.

Bose, Debasis; and Freilich, Alfred, to Allied Corporation. Method of making a nickle high-chromium base brazing filler metal. 4,712,603, Cl. 164-463.000.

Bostwick, Myron A., Jr.: *See*—
Van Nice, H. Lee; Bostwick, Myron A., Jr.; and Kongslie, Keith F., 4,713,520, Cl. 219-121.0LC.

Bothner, Rose M.; and Butler, James L., to Eastman Kodak Company. Electrostatographic apparatus having a transfer drum. 4,712,906, Cl. 355-3.0TR.

Bouldin, Floyd E., to Bouldin & Lawson, Inc. Continuous soil mixing apparatus. 4,712,919, Cl. 366-133.000.

Bouldin & Lawson, Inc.: *See*—
Bouldin, Floyd E., 4,712,919, Cl. 366-133.000.

Boulton, David A.: *See*—
Chang, Michael N.; Thompson, Kathryn L.; and Boulton, David A., 4,713,393, Cl. 514-469.000.

Bowald, Staffan F., to Swedish Graft Technique AB. Implant lens and method and apparatus for its production. 4,713,072, Cl. 623-6.000.

Bowen, James H.: *See*—
Porter, David R.; Bowen, James H.; and Holland, John M., 4,713,841, Cl. 455-608.000.

Bradford, James N.; Ames, Jimmy R.; and Montroll, Andrew H., to Perkin-Elmer Corporation, The. Semiconductor laser and optical amplifier. 4,713,821, Cl. 372-44.000.

Braga, Renzo; Pasquali, Renato; and Mendicino, Franco, to Alfa Romeo Auto S.p.A. Support arm for the truck lid and/or the hood of a motor car. 4,712,825, Cl. 296-76.000.

Brahm, David J.; Grinn, James M.; Hepler, Edward L.; and Schan, Edward P., Jr., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Multiprocessor computing system featuring shared global control. 4,713,834, Cl. 379-28.000.

Brandenstein, Manfred, to SKF Kugallagerfabriken. Ring fastener for machine parts. 4,712,928, Cl. 384-538.000.

Brandes, Wilhelm: *See*—
Kramer, Wolfgang; Weissmuller, Joachim; Reiser, Wolf; Berg, Dieter; Brandes, Wilhelm; and Reinecke, Paul, 4,713,379, Cl. 514-212.000.
Salzburg, Herbert; Hajek, Manfred; Hagemann, Hermann; Kuhle, Engelbert; Fuhrer, Wolfgang; Hanssler, Gerd; Brandes, Wilhelm; and Reinecke, Paul, 4,713,389, Cl. 514-373.000.

Branemark, Per-Ingvar; Kasemo, Bengt; and Lausmaa, Jukka. Method of packaging artificial implants in sterile and contamination-free manner and a package therefor. 4,712,681, Cl. 206-438.000.

Branscomb, Patricia M.: *See*—
Antonelli, Douglas C.; Branscomb, Patricia M.; Broockman, Eric C.; Dickson, LeRoy D.; Koppel, Caralee P.; Ossowski, Richard; and Stokes, Olen L., Jr., 4,713,785, Cl. 364-569.000.

Branston, Paul G.: *See*—
Adams, Joseph S.; and Branston, Paul G., 4,712,379, Cl. 60-632.000.

Bray, David J.; and Piper, Francis R., to Gaydon Technology Limited. Method and system for maintaining a spray pattern. 4,712,736, Cl. 239-11.000.

Bray, Donald T., to Nimbus Water Systems, Inc. Water purifier comprising stages mounted side-by-side to unitary header. 4,713,175, Cl. 210-259.000.

Brearley, Malcolm; and Moseley, Richard B., to Lucas Industries public limited company. Vehicle braking system. 4,712,839, Cl. 303-3.000.

Bremer, James C.; Hurt, Fred S.; Romanski, John G.; Kroupa, Richard F.; and Kraus, Ronald G., to Westinghouse Electric Corp. Concentric detector array and associated hybrid signal processing for coarse and fine electro-optical tracking. 4,713,533, Cl. 250-203.00R.

Breslow, David, to RTC Industries, Inc. Display shelf organizer. 4,712,694, Cl. 211-184.000.

Breuer, Lothar: *See*—
Zulauf, Karlheinz; and Breuer, Lothar, 4,712,593, Cl. 141-113.000.

Briant, Gervais: *See*—
Siffert, Marcel; Briant, Gervais; Feunten, Pierre; Goacolou, Honore ; Petitgrand, Jean-Claude; and Peyret, Francois, 4,712,423, Cl. 73-146.000.

Bricault, Gary S.: *See*—
Weinberger, Joseph; Bricault, Gary S.; Gruber, David; and Rakover, Eleonora, 4,712,907, Cl. 355-7.000.

Bridgeford, Douglas J., to Teepak, Inc. Process for seaming coated cellulose webs. 4,713,135, Cl. 156-218.000.

Bridgestone Corporation: *See*—
Ozaki, Haruhiko; Yamada, Tadatoshi; Machida, Kunio; Ohno, Kiyoshi; Shimazaki, Hirato; Inoue, Hidekimi; and Uji, Ryohei, 4,713,686, Cl. 358-107.000.

Bridgestone Cycle Co., Ltd.: *See*—
Takamiya, Kikuzo; Ishibashi, Hideyuki; and Kozakae, Kunitoshi, 4,712,450, Cl. 74-750.00B.

Bright, Danielle A.: *See*—
Telschow, Jeffrey E.; and Bright, Danielle A., 4,713,467, Cl. 558-18.000.

Brilando, Frank P., to Schwinn Bicycle Company. Cycle exercisers. 4,712,789, Cl. 272-73.000.

Bristol-Myers Company: *See*—
Begum, Selima; Ullah, Ismat; and Nunning, Bernard C., 4,713,246, Cl. 424-455.000.

Brizgis, Lawrence J.; Keleher, Daniel B.; and Bandelow, Vernon D., to Deere & Company. Grain damage analyzer. 4,713,781, Cl. 364-552.000.

Broaddus, Clarke R.; and Gollhardt, Bradley J., to Du Pont de Nemours, E. I., and Company. Apparatus for quenching melt sprun filaments. 4,712,988, Cl. 425-725.000.

Brodie, Malcolm J. Rock climbing anchor. 4,712,754, Cl. 248-1.000.

Broockman, Eric C.: *See*—
Antonelli, Douglas C.; Branscomb, Patricia M.; Broockman, Eric C.; Dickson, LeRoy D.; Koppel, Caralee P.; Ossowski, Richard; and Stokes, Olen L., Jr., 4,713,785, Cl. 364-569.000.

Brooks, Robert E., to TRW Inc. Spatial light modulator systems. 4,712,888, Cl. 350-486.000.

Brosio, Alberto: *See*—
Ambrosio, Renato; Brosio, Alberto; Fausone, Alfredo; and Tofanelli, Adler, 4,713,803, Cl. 370-32.100.

Brother Kogyo Kabushiki Kaisha: *See*—
Morita, Toshiki, 4,712,932, Cl. 400-208.100.
Natsume, Yukihito, 4,712,933, Cl. 400-248.000.
Nomura, Etuzo; Sakakibara, Yasuo; Kozawa, Tetsuo; Nishida, Yukio; and Kondo, Ikuzo, 4,712,497, Cl. 112-315.000.

Brown, Alexander N. Bicycle pump apparatus. 4,712,592, Cl. 141-98.000.

Brown, Arthur E. Balancers for various reciprocating machines using rotating balance weights. 4,712,436, Cl. 74-44.000.

Brown, Byron L. Tool for cutting annular groove. 4,712,951, Cl. 408-158.000.

Brown, David R.; Frost, Charles E., Jr.; and White, Kenneth A., to GTE Products Corporation. Quartz glass crucibles. 4,713,104, Cl. 65-18.100.

Brown, Herbert C., to Aldrich-Boranes, Inc. Production of optically pure organoboranes. 4,713,380, Cl. 568-1.000.

Brown, John; Garron, Stephen A.; and Wurst, John W., to SSMC Inc. Machine stitched buttonhole and method of producing same. 4,712,496, Cl. 112-264.100.

Brown, Richard W.; and Gless, Richard D., Jr., to Stauffer Chemical Company. Method for the preparation of benzyloxyphenoxy pentanoates. 4,713,471, Cl. 560-53.000.

Brown, Robert K. Joint maker. 4,712,942, Cl. 403-174.000.

Brown, Ronald E., to Phillips Petroleum Company. Polymerization of olefinic hydrocarbons and complex-initiator therefor. 4,713,424, Cl. 585-424.000.

Brown, Vernon E., Jr.: *See*—
Ames, Theodore; and Brown, Vernon E., Jr., 4,712,920, Cl. 366-144.000.

Bruna, Costantino D.: *See*—
Perrone, Ettore; Alpegiani, Marco; Zarini, Franco; Bruna, Costantino D.; and Franceschi, Giovanni, 4,713,378, Cl. 514-192.000.

Bruno, Robert; Kipperman, Stuart R.; Mayer, Geoffrey R.; and Thomas, Michael, to Sherwood Medical Company. Enteral feeding devices. 4,713,064, Cl. 604-257.000.

Brunswick Corporation: *See*—
Staerzl, Richard E., 4,712,527, Cl. 123-418.000.

Brunswick Valve & Control, Inc.: *See*—
Abraham, William F., 4,712,441, Cl. 74-89.150.

Bryan, Dennis P.; and Rowe, John B., to International Business Machines Corp. Automatic fault location system for electronic devices. 4,713,815, Cl. 371-29.000.

Bryan, Philip S.; and Herz, Arthur H., to Eastman Kodak Company. Silver halide photosensitive material. 4,713,322, Cl. 430-569.000.

Bryg, William R.: *See*—
Worley, William S., Jr.; Bryg, William R.; and Baum, Allen, 4,713,755, Cl. 364-200.000.

Bryson, Eugene: *See*—
Sharpe, Murem S.; Bryson, Eugene; Manduley, Flavio; Riordan, Eben M., II; and Flesser, Brian D., 4,713,761, Cl. 364-406.000.

BSD Medical Corporation: *See*—
Turner, Paul F., 4,712,559, Cl. 128-422.000.

Buckle, Derek R., to Beecham Group p.l.c. Novel compounds. 4,713,486, Cl. 562-495.000.

Buckley, Thomas F., III; and Wollenberg, Robert H., to Chevron Research Company. Lubricating oil compositions containing modified succinimides (V). 4,713,187, Cl. 252-49.600.

Budapesti Boripari Vallalat: *See*—
David, Dezso; Rovo, Peter; Sipos nee Richter, Terez; Molnar, Gyorgy; Deme, Istvan; and Karnitscher, Tamas, 4,713,078, Cl. 8-94.150.

Budd Company, The: *See*—
Freeman, Richard B.; Goetz, Charles W.; and Eggert, Walter S., Jr., 4,712,710, Cl. 220-414.000.
Herring, James M., Jr., 4,712,488, Cl. 105-224.100.

Budke, Mark P.: *See*—
Allwin, Roger P.; and Budke, Mark P., 4,712,614, Cl. 166-208.000.

Buerger, Gert: *See*—
Pilz, Georg; Buerger, Gert; Barl, Manfred; and Thiel, Gerhard, 4,713,201, Cl. 260-501.170.
Pilz, Georg; Buerger, Gert; Barl, Manfred; and Thiel, Gerhard, 4,713,437, Cl. 528-336.000.

Buhler, Ernst; and Rullo, Antonio, to AG fur industrielle Elektronik AGIE Losone b. Locarno. Pulse generator for spark erosive metal working. 4,713,516, Cl. 219-69.00P.

Bukatov, Alexandr S.: *See*—
Iofis, Naum A.; Vettsel, Rudolf N.; Bukatov, Alexandr S.; and Khurtsilava, Semen G., 4,713,071, Cl. 623-2.000.

Bukoschek, Romuald L.; Eckel, Merowech; and Schroder, Johann, to U.S. Philips Corporation. Discoid cold cartridge insertable into an ice-cream maker. 4,712,386, Cl. 62-342.000.

Bulat, Emel S.; Ditchek, Brian M.; and Butler, Scott J., to GTE Laboratories Incorporated. Method of fabricating recessed gate static induction transistors. 4,713,358, Cl. 437-65.000.

Bull, Christopher H.: *See*—
Bagga, Madan M.; and Bull, Christopher H., 4,713,432, Cl. 526-313.000.

Bull, David R. Surf lock. 4,712,394, Cl. 70-18.000.

Buma, Shuuichi; and Horiyama, Osamu, to Toyota Jidosha Kabushiki Kaisha. Construction of control valve for air suspension. 4,712,775, Cl. 267-220.000.

Bunting, John A.; Pope, Louis M.; and Clark, James L., to Precorp, Inc. Printed circuit board drill and method of manufacture. 4,713,286, Cl. 428-323.000.

Burckhardt America, Inc.: *See*—
Vernon, Thomas, 4,712,369, Cl. 57-417.000.

Burkhardt, Gottfried. Key operated switch for keyboard. 4,713,507, Cl. 200-159.00A.

Burkhardt, Volker. Mechanism for the transportation of objects. 4,712,670, Cl. 198-803.010.

Burroughs Wellcome Co.: *See*—
Blade, Robert J., 4,713,200, Cl. 260-408.000.

Busso, Mario; and Pierini, Marco, to Varian S.p.A. Electronic device for feeding ion pump. 4,713,619, Cl. 324-460.000.

Butler, James L.: *See*—
Bothner, Rose M.; and Butler, James L., 4,712,906, Cl. 355-3.0TR.

Butler, Scott J.: *See*—
Bulat, Emel S.; Ditchek, Brian M.; and Butler, Scott J., 4,713,358, Cl. 437-65.000.

Butrymowicz, Dale: *See*—
Hornbostel, Lloyd; and Butrymowicz, Dale, 4,713,150, Cl. 204-38.400.

Butterfield Group: *See*—
Butterfield, Ida M., 4,713,056, Cl. 604-110.000.

Butterfield, Ida M., to Butterfield Group. Non-reusable hypodermic syringe. 4,713,056, Cl. 604-110.000.

Byers, William A.: *See*—
Carlson, Gerald L.; Pensenstadler, David F.; Snider, Warren E.; and Byers, William A., 4,713,618, Cl. 324-438.000.

Byington, Roy E.; and Pease, William M., to Raytheon Company. Digital memory system. 4,713,794, Cl. 365-45.000.

Byszewski, Wojciech W.; Fallier, Charles N., Jr.; and Lester, James N., to GTE Laboratories Incorporated; and GTE Products Corporation. Multipulse starting aid for high-intensity discharge lamps. 4,713,587, Cl. 315-289.000.

C. H. Perrott, Inc.: *See*—
Perrott, Charles H., 4,712,574, Cl. 137-217.000.

C I-L Inc.: *See*—
Chin, Chang-Hwa; Edmonds, Anthony C. F.; and Evans, Colin M., 4,713,232, Cl. 423-390.000.

C. Reichert Optische Werke AG: *See*—
Schindl, Klaus P., 4,712,889, Cl. 350-511.000.

Caccioppo, Sebastian. Combination brush/roller hair-grooming tool. 4,712,570, Cl. 132-40.000.

Cadbury Schweppes, PLC: *See*—
Karlis, Robert G.; Dole, Charles M.; Webster, Gary L.; and Andersen, George J., 4,712,713, Cl. 222-3.000.

Cage, Jerry L., to Allied Corporation. Fail safe circuit for an anti-lock braking system modulator drive. 4,712,841, Cl. 303-92.000.

Cahill, Richard F.; Eck, Jeffrey A.; Schwantz, Gerald L.; Theriault, John P.; Turek, Philip A.; Udd, Eric; Wagoner, Raymond E.; and Wanser, Keith H., to McDonnell Douglas Corporation. Fiber optic earth rotation gyro compass. 4,712,306, Cl. 33-304.000.

Cairns, John F.; and Cowell, Gawin W., to Imperial Chemical Industries PLC. Porous diaphragm for electrolytic cell. 4,713,163, Cl. 204-296.000.

California Auto Trends: *See*—
Albrecht, Leonard N., 4,712,828, Cl. 296-121.000.

Camenzind, Hans R. Electronic proximity key and lock. 4,713,660, Cl. 340-825.690.

Camera, Ettore: *See*—
De Lucchi, Ottorino; Filippuzzi, Fabiola; Modena, Giorgio; and Camera, Ettore, 4,713,466, Cl. 549-464.000.

Cameron, Robert W. Line throw-bag. 4,713,033, Cl. 441-84.000.

Cameron, Thomas B.; Swanson, Wilbur W.; Tartaglia, John M.; and Cox, Thomas B., to Amax Inc. Production of aluminum-SiC composite using sodium tetrasborate as an addition agent. 4,713,111, Cl. 75-68.00R.

Campana, Joseph E., to United States of America, Navy. Ion beam neutralizer. 4,713,542, Cl. 250-251.000.

Campbell, David L., to Pronto Service Facilities, Inc. Hood conveying apparatus having an outwardly reaching basket. 4,712,650, Cl. 186-41.000.

Campbell, Kent D.; Dietsche, Laura J.; Crampton, Lee B.; Hovda, Keith D.; Tyson, George K.; and Wilson, Charles A., to Dow Chemical Company, The. Process for the recovery of ammonia and fluoride values from ammonium fluoride solutions. 4,713,231, Cl. 423-356.000.

Campen, Kenneth W., to Tecumseh Products Company. Ignition system. 4,712,521, Cl. 123-149.00C.

Campolito, Dino. Tube cutting device. 4,712,954, Cl. 409-163.000.

Canadian Patents and Development Ltd.: *See*—
Howard, John; and Stirling, Marie, 4,713,185, Cl. 252-8.554.

Canon Kabushiki Kaisha: *See*—
Ayata, Naoki, 4,713,784, Cl. 364-559.000.
Baba, Takeshi; Imataki, Hiroyuki; Usui, Masayuki; Serizawa, Takashi; and Nose, Hiroyasu, 4,712,882, Cl. 350-413.000.
Haraguchi, Shosuke, 4,712,898, Cl. 354-288.000.
Kanbe, Junichiro; and Yoshinaga, Kazuo, 4,712,872, Cl. 350-333.000.
Kanbe, Junichiro; and Okada, Shinjiro, 4,712,873, Cl. 350-337.000.
Kato, Masatake; Tsuji, Sadahiko; and Asano, Toshiaki, 4,712,883, Cl. 350-427.000.
Kawamura, Hideaki; Sakurada, Nobuaki; Sato, Yuichi; and Watanabe, Yoshitaka, 4,713,701, Cl. 358-298.000.
Kawamura, Naoto; and Abe, Shunichi, 4,713,684, Cl. 358-78.000.

Nakayama, Tomobumi; Mori, Toshihiko; Hirose, Masayuki; Ohbuchi, Toru; Miyata, Masanori; Nakamura, Shinichi; and Honjo, Takeshi, 4,712,908, Cl. 355-14.0SH.
Ohtaka, Keiji, 4,712,901, Cl. 354-407.000.
Okada, Shinjiro; Kanbe, Junichiro; Tsuboyama, Akira; and Inaba, Yutaka, 4,712,877, Cl. 350-350.00S.
Sekimura, Nobuyuki; Kamio, Masaru; Takao, Hideaki; Motoi, Taiko; and Murata, Tatsuo, 4,712,874, Cl. 350-339.00F.
Suzuki, Nobuyuki; Shimizu, Masao; and Katsuragawa, Mitsuhiro, 4,713,571, Cl. 310-316.000.
Takahashi, Teruomi; and Sato Tadashi, 4,713,698, Cl. 358-296.000.
Taniguchi, Osamu; Okada, Shinjiro; and Ando, Yujiro, 4,712,878, Cl. 350-350.00S.
Tsuboyama, Akira; Katagiri, Kazuharu; and Kanbe, Junichiro, 4,712,875, Cl. 350-344.000.
Watanabe, Yoshitaka; Sakurada, Nobuaki; Kawamura, Hideaki; and Sato, Yuichi, 4,713,746, Cl. 346-1.100.
Yui, Yoshikiyo, 4,713,675, Cl. 355-69.000.

Canziani, Francesco. Plant for sorting items, with self driven carriages. 4,712,965, Cl. 414-339.000.

Captive Plastics, Inc.: *See—*
Lutz, Michael, 4,712,699, Cl. 215-329.000.

Carl Still GmbH & Co. KG, Firma: *See—*
Offermann, Ludwig, 4,713,148, Cl. 202-248.000.

Carlomagno, William D.: *See—*
Noel, Raymond; Robinson, William M.; Cherian, Gabe; Clifford, Thomas H.; Carlomagno, William D.; Deasy, William M.; Grassauer, Willie K.; Haygood, David K.; Sherlock, H. Paul; and White, Harry E., 4,712,721, Cl. 228-56.300.

Carlson, Gerald L.; Pensenstadler, David F.; Snider, Warren E.; and Byers, William A., to Westinghouse Electric Corp. On-line calibration system for chemical monitors. 4,713,618, Cl. 324-438.000.

Carlson, Gerald L., to Westinghouse Electric Corp. Automatic on-line chemistry monitoring system having improved calibration unit. 4,713,772, Cl. 364-496.000.

Carlson, Robert L., to Miner Enterprises, Inc. Side bearing unit for railroad car, including method of making. 4,712,487, Cl. 105-199.300.

Carre, Jean-Jacques, to Bendix France. Deceleration-responsive braking corrector. 4,712,840, Cl. 303-24.00R.

Carrell, Ross M., to RCA Corporation. Adjustable vacuum pad. 4,712,784, Cl. 271-108.000.

Carroll, Frank I.: *See—*
Chiang, Peter K.; Richard, Michelle M.; Padilla, Felipe N.; Carroll, Frank I.; and Abraham, Philip, 4,713,391, Cl. 514-412.000.

Carroll Touch Inc.: *See—*
Masters, Timothy E.; and Wehrer, Wayne J., 4,713,534, Cl. 250-214.00B.

Carson, William G., to Rohm and Haas Co. Crystallizable polyester resin having high impact strength and dimensional stability. 4,713,268, Cl. 428-35.000.

Carter, Garry L., to Medical Engineering Corporation. Ureteral stent kit. 4,713,049, Cl. 604-8.000.

Carter, William S., to Xilinx, Inc. Bidirectional buffer amplifier. 4,713,557, Cl. 307-242.000.

Cartledge, Robert, to Shepard & Associates. Document carrier. 4,712,820, Cl. 294-138.000.

Cartner, Jack O. Four-way reversible ditcher blades. 4,712,320, Cl. 37-92.000.

Cary, Artbur P.; and Lyons, Leslie W. Easy to lock deadbolt structure. 4,712,396, Cl. 70-129.000.

Cary, Jeffrey W.: *See—*
Srinivasan, Vadake R.; Cary, Jeffrey W.; Chon, Younghae; and Narva, Kenneth E., 4,713,336, Cl. 435-155.000.

Casco Products Corporation: *See—*
Fitz, Edward J.; and Pesapane, Dominic, 4,713,733, Cl. 362-80.000.
Pesapane, Dominic, 4,713,017, Cl. 439-142.000.

Castelli, Joseph Q.; and Johnson, Don L. Storage box for personal computer interior. 4,712,843, Cl. 312-242.000.

Castle Company: *See—*
Enselin, Frieder H., 4,712,544, Cl. 128-303.140.

Castro, Bernard, to Castro Convertible Corporation. Mattress guard. 4,712,261, Cl. 5-499.000.

Castro Convertible Corporation: *See—*
Castro, Bernard, 4,712,261, Cl. 5-499.000.

Caterpillar Inc.: *See—*
Hadank, John M.; and Creger, Todd D., 4,712,376, Cl. 60-427.000.

Catiller, Robert D.; Faivre, John D.; and Rakpongs, Fah, to Computer Power Systems Corporation. Apparatus for providing cost efficient power measurement. 4,713,608, Cl. 324-142.000.

Caudel, Edward R.: *See—*
Magar, Surendar S.; Essig, Daniel L.; Simpson, Richard D.; and Caudel, Edward R., 4,713,748, Cl. 364-200.000.

Caughran, David. Piston with turbine fan for use in internal combustion engines. 4,712,526, Cl. 123-307.000.

Caves, Keith; and Woodman, Douglas E., to STC plc. Intelligence transmission system of the local area network type. 4,713,807, Cl. 370-94.000.

Cavitt, Michael B., to Dow Chemical Company, The. Paint formulation comprising a thermally stable capped thermoplastic phenolic resin. 4,713,404, Cl. 523-172.000.

Cazin, Pierre, to Nestec, S.A. Display card of plastic material with two anti-theft systems. 4,712,683, Cl. 206-478.000.

Celanese Corporation: *See—*
Kusumgar, Rajal M., 4,713,414, Cl. 525-64.000.

Cellich, William A.: *See—*
Hodgens, Henry M., II; and Cellich, William A., 4,713,120, Cl. 134-3.000.

Celotex Corporation, The: *See—*
Kasprzak, David P., 4,712,351, Cl. 52-573.000.

Central Electricity Generating Board of Sudbury House: *See—*
Theocharous, Evangelos, 4,713,538, Cl. 250-227.000.

Central Plastics Company: *See—*
Inhofe, James A., Jr.; and Evans, Harold J., 4,713,129, Cl. 156-71.000.

Centre National d'Etudes des Telecommunications: *See—*
Veillard, Jacques, 4,713,689, Cl. 358-146.000.

Cgee Alsthom: *See—*
Heng, Jean-Paul; Jusseau, Marcel; and Humbert-Labeaumaz, Alain, 4,712,863, Cl. 350-96.210.

Chaffy, Joseph; Langon, Bernard; and Leroy, Michel, to Aluminium Pechiney. Device for connection between very high intensity electrolysis cells for the production of aluminium comprising a supply circuit and an independent circuit for correcting the magnetic field. 4,713,161, Cl. 204-243.00M.

Chambersburg Engineering Company: *See—*
Crout, Charles J.; Frame, Charles W.; and Harris, Ronald N., 4,712,404, Cl. 72-8.000.
Crout, Charles J.; Frame, Charles W.; and Harris, Ronald N., 4,712,405, Cl. 72-19.000.
Crout, Charles J.; Frame, Charles W.; and Harris, Ronald N., 4,712,415, Cl. 72-8.000.

Champion International Corporation: *See—*
Hecking, Robert J., 4,712,737, Cl. 239-58.000.

Champion Spark Plug Company: *See—*
Bihn, Raymond J., 4,712,739, Cl. 239-290.000.

Chan, Yiu-Fai: *See—*
Hartmann, Robert F.; Chan, Yiu-Fai; Frankovich, Robert J.; Ou, Jung-Hsing; So, Hock C.; and Wong, Sau-Ching, 4,713,792, Cl. 364-900.000.

Chang, John: *See—*
Chou, Hsii C.; Wu, Jeef; and Chang, John, 4,712,252, Cl. 2-87.000.

Chang, Michael N.; Thompson, Kathryn L.; and Boulton, David A., to Merck & Co., Inc. Phenylpropyl-2,3-dihydrobenzofurans useful as anti-inflammatory agents. 4,713,393, Cl. 514-469.000.

Charbrol, Jean-Jacques; and Lambert, Jean-Pierre, to Composites Aquitaine S.A.; and Etablissments Poirier S.A. Folding chair comprising quick unlocking means. 4,712,830, Cl. 297-42.000.

Charles Stark Draper Laboratory, Inc., The: *See—*
Fyler, Donald C., 4,712,971, Cl. 414-744.00R.

Chattha, Mohinder S.; and Theodore, Ares N., to Du Pont de Nemours, E. I., and Company. High solids coating compositions. 4,713,427, Cl. 525-510.000.

Chaudhuri, Ratan K.; Login, Robert B.; and Tracy, David J., to GAF Corporation. Synthesis of n-epoxypropyl lactams. 4,713,463, Cl. 548-517.000.

Chaveron, Henri; Pontillon, Jean; Billon, Michel; Adenier, Herve ; and Kamoun, Ahmed, to Clextral. Process for preparing a chocolate paste. 4,713,256, Cl. 426-631.000.

Chebowski, Jerome E., to Rees, Inc. Palm switch actuator and latch. 4,713,509, Cl. 200-328.000.

Chelminski, Stephen V., to Bolt Technology Corporation. Method and system for generating shear waves and compression waves in the earth for seismic surveying. 4,712,641, Cl. 181-113.000.

Chen, Yi-Yi. Hunting glove with telescopic forefinger sheath. 4,712,253, Cl. 2-159.000.

Cheng, Huey-Der. Structural frame connector. 4,712,695, Cl. 211-191.000.

Cheng, Peter S. C. Convertible toothbrush. 4,712,267, Cl. 15-172.000.

Cheng, Steven S.: *See—*
Albanese, Andres; and Cheng, Steven S., 4,712,859, Cl. 350-96.160.

Cherian, Gabe: *See—*
Noel, Raymond; Robinson, William M.; Cherian, Gabe; Clifford, Thomas H.; Carlomagno, William D.; Deasy, William M.; Grassauer, Willie K.; Haygood, David K.; Sherlock, H. Paul; and White, Harry E., 4,712,721, Cl. 228-56.300.

Chernenko, Ivan A.: *See—*
Lebedev, Vladimir K.; Chernenko, Ivan A.; Dyahlenko, Alexandr T.; Litvin, Leonid V.; and Tishura, Vladimir I., 4,712,724, Cl. 228-112.000.

Chesebrough-Pond's, Inc.: *See—*
Remz, Harvey M.; Gordon, Philip J.; Cunningham, John D.; and Melnik, Joseph D., 4,712,571, Cl. 132-88.700.

Chet, Ilan; Sivan, Alex; and Elad, Yigal, to Yissum Research Development Co. of the Hebrew University of Jerusalem. Novel isolate of trichoderma, fungicidal compositions containing said isolate and use thereof. 4,713,342, Cl. 435-254.000.

Cheung, Tsang: *See—*
Gille, Henrick K.; Willing, Richard S.; Bloom, William G.; Siegel, Bernard; Cheung, Tsang; Lobodzinski, Richard; and Gilroy, Keith, 4,712,567, Cl. 128-771.000.

Chevron Research Company: *See—*
Buckley, Thomas F., III; and Wollenberg, Robert H., 4,713,187, Cl. 252-49.600.
Erdman, Timothy R., 4,713,190, Cl. 252-51.50A.
Goodrich, Judson E., 4,713,117, Cl. 106-273.00R.
Wollenberg, Robert H., 4,713,188, Cl. 252-51.50A.

Chiang, Chun C., to Dar Yu Electronic Co., Ltd. Decorative light sets. 4,713,586, Cl. 315-200.00A.

Chiang, John P.; and Lantero, Oreste J., Jr., to Miles Laboratories, Inc. Immobilization of biocatalysts on granular diatomaceous earth. 4,713,333, Cl. 435-96.000.

Chiang, Peter K.; Richard, Michelle M.; Padilla, Felipe N.; Carroll, Frank I.; and Abraham, Philip, to United States of America, Army; and Research Triangle Institute. Azabicycloalkane phenyl substituted alkane carboxylates, their preparation and use as anticholinergic agents. 4,713,391, Cl. 514-412.000.

Chiapello, Jean-Michel: *See*—
Gal, Jean-Yves; Chiapello, Jean-Michel; Peyrot, Martial; and Tourneux, Etienne , 4,713,156, Cl. 204-182.400.

Chiasson, Moise. Inflatable travel pillow with case. 4,712,259, Cl. 5-441.000.

Chicago Lock Company: *See*—
Steinbach, Robert, 4,712,400, Cl. 70-369.000.

Chicago Metallic Corporation: *See*—
Vukmanic, Ronald W., 4,712,350, Cl. 52-484.000.

Chicopee: *See*—
Mays, Alfred T.; and Wereson, Nicholas, 4,713,134, Cl. 156-181.000.

Chigusa, Takeshi: *See*—
Matsuyama, Kiyoshi; Suzuki, Takatoshi; and Chigusa, Takeshi, 4,713,444, Cl. 528-502.000.

Children's Medical Center Corporation, The: *See*—
Gallop, Paul M.; Henson, Edward; and Fluckiger, Rudolf, 4,713,346, Cl. 436-86.000.

Childs, Ernest A.; and Narasimhan, Rajagopalan, to Schreiber Foods, Inc. Casein-soluble protein complex. 4,713,254, Cl. 426-582.000.

Chin, Chang-Hwa; Edmonds, Anthony C. F.; and Evans, Colin M., to C-I-L Inc. Process for the destruction of by-product tetranitromethane. 4,713,232, Cl. 423-390.000.

Chin, Timothy C.: *See*—
Morris, Robert C.; Long, Margaret N.; Chin, Timothy C.; and Heller, Donald F., 4,713,820, Cl. 372-41.000.

Choi, Jung W. Electrode holder for electric discharge processing machines. 4,713,515, Cl. 219-69.00E.

Cholnoky, Eszter: *See*—
Ezer, Elemer; Harsanyi, Kalman; Petho, Hajnalka V.; Matuz, Judit; Szporny, Laszlo; Cholnoky, Eszter; Kuthi, Csaba; Trischler, Ferenc; Hegedus, Bela; Kapolnas, Marta; and Kallay, Anna, 4,713,388, Cl. 514-346.000.

Chon, Younghae: *See*—
Srinivasan, Vadake R.; Cary, Jeffrey W.; Chon, Younghae; and Narva, Kenneth E., 4,713,336, Cl. 435-155.000.

Chopdekar, Vilas M.: *See*—
Harris, James E.; Berger, Abe; Chopdekar, Vilas M.; Matzner, Markus; and Spanswick, James, 4,713,438, Cl. 528-337.000.

Chou, Hsii C.; Wu, Jeef; and Chang, John. Anti-wind raincoats. 4,712,252, Cl. 2-87.000.

Chou, Ta-Chin. Cassette type cleaning device for the cleaning of playing/recording head, erasing head, and capstan/pinch roller. 4,713,712, Cl. 360-128.000.

Christodoulou, Spiros, to Din Engineering Limited. Reaction chamber conveyor. 4,712,312, Cl. 34-57.00D.

Chrysler Motors Corporation: *See*—
Emmer, Eric D., 4,712,941, Cl. 403-151.000.
Mills, Ronald E.; and Perry, Peter J., 4,712,823, Cl. 296-37.800.

Chum, Stanley, to GTE Sprint Communications Corp. Diagnostic technique for determining fault locations within a digital transmission system. 4,713,810, Cl. 371-4.000.

Chun, Kil Whan; and Kyllmann, Clemens A., to Lever Brothers Company. Particles containing dihalohydantoin bleach in a diluted core. 4,713,079, Cl. 8-101.000.

Churkin, Vladimir G.: *See*—
Negrutsky, Sergei B.; Klimov, Sergei B.; Negrutsky, Boris F.; and Churkin, Vladimir G., 4,712,772, Cl. 254-264.000.

Ciba-Geigy A.G.: *See*—
Kristen, Ulrich; Haring , Ulrich; Fischer, Francis; and Cron, Alain, 4,713,186, Cl. 252-30.000.

Ciba-Geigy Corporation: *See*—
Bagga, Madan M.; and Bull, Christopher H., 4,713,432, Cl. 526-313.000.
Becker, Carl, 4,713,081, Cl. 8-527.000.
Francis, John E.; and Gelotte, Karl O., 4,713,383, Cl. 514-267.000.
Kaschig, Jurgen; and Finter, Jurgen, 4,713,422, Cl. 525-326.700.
Mulhaupt, Rolf; Renner, Alfred; and Lauterbach, Horst, 4,713,428, Cl. 525-523.000.
Renner, Alfred; Haug, Theobald; and Schreiber, Bruno, 4,713,417, Cl. 525-117.000.
Scheibli, Peter; and Seitz, Karl, 4,713,082, Cl. 8-549.000.
Schurter, Rolf; and Rempfler, Hermann, 4,713,109, Cl. 71-94.000.
Spivack, John D.; Steinberg, David H.; and Odorisio, Paul A., 4,713,475, Cl. 560-75.000.
Topfl, Rosemarie; and Abel, Heinz, 4,713,482, Cl. 560-196.000.

Cieslak, Ronald H.: *See*—
Kloker, Kevin L.; and Cieslak, Ronald H., 4,713,790, Cl. 364-784.000.

Cincinnati Milacron Inc.: *See*—
Witzel, John R.; and Weisgerber, Paul J., 4,712,953, Cl. 409-131.000.

Claborn, Morris W., to Wedger, Inc. Apparatus for converting a flexible line trimmer for use as a lawn edger. 4,712,363, Cl. 56-16.700.

Clamco Corporation: *See*—
Walkiewicz, Zigmunt J., Jr.; and Lynch, William C., 4,712,459, Cl. 83-171.000.

Clark, Clarence E., Jr.; and Fayter, Richard G., Jr., to National Distillers and Chemical Corporation. Synthesis of high-purity dialkyl 2-vinylcyclopropane-1,1-dicarboxylate. 4,713,479, Cl. 560-124.000.

Clark, James L.: *See*—
Bunting, John A.; Pope, Louis M.; and Clark, James L., 4,713,286, Cl. 428-323.000.

Clark, Patrick J.: *See*—
Maroulis, Peter J.; Coe, Charles G.; Kuznicki, Steven M.; Clark, Patrick J.; and Roberts, David A., 4,713,362, Cl. 502-85.000.

Clarke, John B.; Firth, John F.; and Walker, John R., to Allied Colloids Limited. Process of forming prepasted wallcoverings. 4,713,264, Cl. 427-207.100.

Clarkson, Bruce A.; Frere, Ronald J.; Loughlin, Thomas G.; Taylor, William W., Jr.; and Mongeau, Peter, to Emhart Industries, Inc. Electronic locking system and key therefor. 4,712,398, Cl. 70-276.000.

Clausen, Thomas: *See*—
Konrad, Eugen; and Clausen, Thomas, 4,713,080, Cl. 8-408.000.

Claxton John C. Three dimensional stacked reproduction screen. 4,712,869, Cl. 350-126.000.

Clayton, Jan E.: *See*—
Scott, A. Carlisle; Clayton, Jan E.; and Garnier, Jacques, 4,713,775, Cl. 364-513.000.

Clevite Industries Inc.: *See*—
Goodwin, Roy S., 4,712,411, Cl. 72-344.000.

Clextral: *See*—
Chaveron, Henri; Pontillon, Jean; Billon, Michel; Adenier, Herve ; and Kamoun, Ahmed, 4,713,256, Cl. 426-631.000.

Cliff, John F.; and Walton, Robert R., to International Computers Limited. Multi-programmed data processing system with facility for inspecting state of background program. 4,713,656, Cl. 340-723.000.

Clifford, Thomas H.: *See*—
Noel, Raymond; Robinson, William M.; Cherian, Gabe; Clifford, Thomas H.; Carlomagno, William D.; Deasy, William M.; Grassauer, Willie K.; Haygood, David K.; Sherlock, H. Paul; and White, Harry E., 4,712,721, Cl. 228-56.300.

Cobb, Michael E.: *See*—
Allen, Jimmy D.; Cobb, Michael E.; Hillman, Robert S.; Mungall, Dennis R.; Ostoich, Vladimir E.; and Stroy, Gary H., 4,712,460, Cl. 83-208.000.

Cobble, Danna J. Nursing blanket. 4,712,251, Cl. 2-49.00R.

Coderre, James C.: *See*—
Tung, Chi F.; and Coderre, James C., 4,712,868, Cl. 350-105.000.

Codex Corporation: *See*—
Eyuboglu, Vedat M., 4,713,829, Cl. 375-37.000.
Wei, Lee-Fang, 4,713,817, Cl. 371-43.000.

Coe, Charles G.: *See*—
Maroulis, Peter J.; Coe, Charles G.; Kuznicki, Steven M.; Clark, Patrick J.; and Roberts, David A., 4,713,362, Cl. 502-85.000.

Cogswell, Frederic N.; and Measuria, Umakant, to Imperial Chemical Industries PLC. Reinforced composite structures. 4,713,283, Cl. 428-240.000.

Cohen, Arie: *See*—
Booth, Llewellyn D.; and Cohen, Arie, 4,713,202, Cl. 264-46.500.

Cohen, Joel S.: *See*—
Lasker, Martin L.; and Cohen, Joel S., 4,713,737, Cl. 362-285.000.

Cohen, Marlene L.; Fuller, Ray W.; Garbrecht, William L.; and Whitten, Kathleen R., to Eli Lilly and Company. Selective method for blocking $5HT_2$ receptors. 4,713,384, Cl. 514-288.000.

Colato, Albert E., to Plastics, Inc. Microwave oven turntable shelf structure. 4,713,513, Cl. 219-10.55F.

Coleman, James C.: *See*—
Harris, Charles F., Jr.; and Coleman, James C., 4,712,341, Cl. 52-208.000.

Coleman, Leonard J.: *See*—
Hardie, Laurie S.; and Coleman, Leonard J., 4,712,538, Cl. 128-24.100.

Collins, John M.: *See*—
Duncan, L. Scot; Groth, Hugh F.; and Collins, John M., 4,712,740, Cl. 239-340.000.

Collins, Paul W.; and Gasiecki, Alan F., to G. D. Searle & Co. Omega cycloalkyl prostaglandins. 4,713,477, Cl. 560-118.000.

Color Arts, Inc.: *See*—
Poplawski, Judith A.; and Andersen, David J., 4,713,012, Cl. 434-373.000.

Colorado Video, Incorporated: *See*—
Southworth, Glen R.; and Cornilsen, Robert J., 4,713,693, Cl. 358-160.000.

Colpaert, James J.: *See*—
Temple, Robert B.; and Colpaert, James J., 4,712,654, Cl. 188-71.800.

Comalco Aluminium Limited: *See*—
Andrews, William H., 4,713,203, Cl. 264-117.000.

Comlinear Corporation: *See*—
Nelson, David A., 4,713,628, Cl. 330-254.000.

Commissariat a l'Energie Atomique: *See*—
Laviron, Andre , 4,713,606, Cl. 324-73.00R.

Communications Satellite Corporation: *See*—
Matthews, David, 4,713,630, Cl. 331-4.000.

Compagnie Generale de Geophysique: *See*—
Scott, A. Carlisle; Clayton, Jan E.; and Garnier, Jacques, 4,713,775, Cl. 364-513.000.

Compagnie Industrielle de Mecanismes en abrege C.I.M.: *See*—
Grandjean, Richard, 4,712,817, Cl. 292-336.300.

Compagnie Industrielle des Telecommunications Cit-Alcatel: *See*—
Henaff, Bernard, 4,713,805, Cl. 370-85.000.

Composites Aquitaine S.A.: *See*—
Charbrol, Jean-Jacques; and Lambert, Jean-Pierre, 4,712,830, Cl. 297-42.000.
Computer Power Systems Corporation: *See*—
Catiller, Robert D.; Faivre, John D.; and Rakpongs, Fah, 4,713,608, Cl. 324-142.000.
Conard, Wendell R.: *See*—
Hayes, Robert A.; and Conard, Wendell R., 4,713,409, Cl. 524-518.000.
Confidence Corporation: *See*—
Krietemeier, Rickie F.; and Ross, Laurence W., 4,713,164, Cl. 204-400.000.
Conforti, Joseph A., to GTE Communication Systems Corporation. Circuit for CCIS data transfer between a CPU and a plurality of terminal equipment controllers. 4,713,793, Cl. 364-900.000.
Connelly, Lawrence J.: *See*—
Owen, David O.; and Connelly, Lawrence J., 4,713,222, Cl. 423-122.000.
Conoco Inc.: *See*—
Newman, Bruce A., 4,713,168, Cl. 208-131.000.
Conover, Gilbert; Minior, Thaddeus; and Willis, John P., to Ilex Corporation. Sensor having ion-selective electrodes. 4,713,165, Cl. 204-403.000.
Conrad, Hans-Jurgen, to Robert Bosch GmbH. Mixing arrangement for a combustible gas mixture. 4,712,998, Cl. 432-159.000.
Conroy-Wass, Theodore R., to Hughes Aircraft Company. Quick-release multi-module terminating assembly. 4,713,014, Cl. 439-67.000.
Consiglio Nazionale Delle Richerche: *See*—
De Lucchi, Ottorino; Filippuzzi, Fabiola; Modena, Giorgio; and Camera, Ettore, 4,713,466, Cl. 549-464.000.
Container Corporation of America: *See*—
Udell, Theodore H.; and Koller, David R., 4,713,207, Cl. 264-515.000.
Cook, Raymond: *See*—
Wenham, Bruce T.; Cook, Raymond; and Hunter, Clifford R., 4,712,339, Cl. 52-173.0PS.
Cooley, Dennis A.: *See*—
Quick, James R.; Mitchell, James W.; and Cooley, Dennis A., 4,713,510, Cl. 219-10.55E.
Cooper Industries, Inc.: *See*—
Date, K. Henry; and Wainio, Ronald, 4,713,505, Cl. 200-153.0SC.
Nash, William H.; and Fowler, Eugene C., 4,713,644, Cl. 337-158.000.
Cooper, John F.; Kirkpatrick, Edward S.; and Limsker, Ralph, to International Business Machine Corporation. Method for distributing wire load in a multilayer package and the resulting product. 4,713,773, Cl. 364-491.000.
CooperVision, Inc.: *See*—
Steppe, Dennis L.; Hood, Larry L.; and Boggs, Gary D., 4,713,051, Cl. 604-30.000.
Cordis Corporation: *See*—
MacGregor, David C., 4,712,553, Cl. 128-335.500.
Cordis Leads, Inc.: *See*—
Harris, Donald L., 4,712,557, Cl. 128-419.00P.
Core Industries Inc.: *See*—
Feterl, Leon G., 4,712,922, Cl. 366-288.000.
Cornet, Michel; and Michel, Pierre, to Institute Technique de Cereales et des Fourrages; Association Generale de Producteurs de Mais; and Ateliers Rolland S.A. Harvester for experimental plots of ground. 4,712,362, Cl. 56-16.500.
Cornilsen, Robert J.: *See*—
Southworth, Glen R.; and Cornilsen, Robert J., 4,713,693, Cl. 358-160.000.
Corona Engineering Co., Ltd.: *See*—
Kikuchi, Yoshikazu; and Nakao, Reiro, 4,713,092, Cl. 55-130.000.
Corrales, Patrick G., to ITT Corporation. Retrofittable optic fiber contact assembly. 4,712,860, Cl. 350-96.200.
Cosden Technology, Inc.: *See*—
Searl, Alonzo H.; Hahn, Granville J.; and Rutledge, Raleigh N., 4,713,271, Cl. 428-36.000.
Coston, David B., to Torcon Products, Inc. Fractional frequency converter using zero switching of input frequency halfwaves. 4,713,744, Cl. 363-160.000.
Couch, Harold T.: *See*—
Kesten, Arthur S.; Haught, Alan F.; and Couch, Harold T., 4,712,610, Cl. 165-104.120.
Couprie, Francois. Device for evacuating into the ambient air combustion products from a condensation boiler. 4,712,515, Cl. 122-7.00R.
Courtois, Jean-Claude, to Labavia S.G.E. Armature rotors for electromagnetic brakes. 4,712,656, Cl. 188-218.0XL.
Cowell, Gawin W.: *See*—
Cairns, John F.; and Cowell, Gawin W., 4,713,163, Cl. 204-296.000.
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Crawford, Ronald L., to University of Minnesota, Regents of the. Biodegradation of pentachlorophenol. 4,713,340, Cl. 435-253.000.
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Cron, Alain: *See*—
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Crop, Roland E., to Tektronix, Inc. Digital minimum-maximum value sequence processor. 4,713,771, Cl. 364-487.000.
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Crowe, Lawrence E., to Sundstrand Corporation. Integrated evaporator and thermal expansion valve assembly. 4,712,384, Cl. 62-225.000.
Cruise, Billy J. High-speed bow limbs. 4,712,533, Cl. 124-23.00R.
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Curtis, David C. Sausage stuffer. 4,712,274, Cl. 17-39.000.
Cuschera, Casper. Nested hub knock-down pedestal. 4,712,758, Cl. 248-188.700.
Cvek, Sava. Modelmaker's miter jig. 4,712,462, Cl. 83-762.000.
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Arold, Klaus; Grimm, Hermann, deceased; and Koukal, Heinz, 4,712,608, Cl. 165-41.000.
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Broaddus, Clarke R.; and Gollhardt, Bradley J., 4,712,988, Cl. 425-725.000.
Chattha, Mohinder S.; and Theodore, Ares N., 4,713,427, Cl. 525-510.000.
Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., 4,713,425, Cl. 525-438.000.
Logothetis, Anestis L.; and Stewart, Charles W., 4,713,418, Cl. 525-200.000.
Nahas, Robert C.; and Stroile, Clifford H., 4,713,265, Cl. 427-341.000.
Roy, Suva B., 4,712,310, Cl. 34-5.000.
Shiffler, Donald A., 4,713,289, Cl. 428-361.000.
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Dupuy, Francois, 4,713,046, Cl. 493-6.000.
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Durkan, Martin J., Jr. Super-elliptical adaptor ring for refuse containers and the like. 4,712,701, Cl. 220-71.000.
Durkee Industrial Foods Corp.: *See*—
Seighman, Jon T., 4,713,251, Cl. 426-96.000.
Dutton, Patrick F.; and Jackson, Earl W., Jr., to International Business Machines Corporation. Masking commands for a second processor when a first processor requires a flushing operation in a multiprocessor system. 4,713,751, Cl. 364-200.000.
Dwyer, Frank J.: *See*—
Zwolinski, Leon M.; and Dwyer, Frank J., 4,713,400, Cl. 521-131.000.
Dynapert-HTC Corporation: *See*—
Derrico, Gerard G., 4,712,719, Cl. 228-37.000.
Dynisco, Inc.: *See*—
Wareham, William, 4,712,430, Cl. 73-706.000.
Dyott, Richard B., to Andrew Corporation. Indium-clad fiber-optic polarizer. 4,712,866, Cl. 350-96.300.
Dyshlenko, Alexandr T.: *See*—
Lebedev, Vladimir K.; Chernenko, Ivan A.; Dyshlenko, Alexandr T.; Litvin, Leonid V.; and Tishura, Vladimir I., 4,712,724, Cl. 228-112.000.
E.G.O. Elektro-Gerate Blanc u. Fischer: *See*—
Essig, Willi; Mayer, Hans; and Mannuss, Siegfried, 4,713,502, Cl. 200-61.820.
Earhart, Jonathan P.; Kostecki, John A.; and McNutt, Adrian C., to Stauffer Chemical Company. Process for removing alkali metal

aluminum silicate scale deposits from surfaces of chemical process equipment. 4,713,119, Cl. 134-3.000.

Eastep, Calvin W., to Kowah, Inc. Microcomputer controlled instant electric water heating and delivery system. 4,713,525, Cl. 219-308.000.

Eastman Kodak Company: *See—*
Bothner, Rose M.; and Butler, James L., 4,712,906, Cl. 355-3.0TR.
Bryan, Philip S.; and Herz, Arthur H., 4,713,322, Cl. 430-569.000.
Findlay, John B.; Wu, Annie L.; and Norton, Gary E., 4,713,327, Cl. 435-17.000.
Harrison, Daniel J., 4,713,365, Cl. 503-227.000.
Maskasky, Joe E., 4,713,320, Cl. 430-567.000.
Maskasky, Joe E., 4,713,323, Cl. 430-569.000.
Van Sickle, Dale E., 4,713,472, Cl. 560-53.000.

Eastman Machine Company: *See—*
Barrett, Robert C., 4,712,303, Cl. 30-275.000.

Easy Use Products, Inc.: *See—*
Ehrenhalt, Caradoc, 4,712,766, Cl. 251-90.000.

Eberhardt, H. Alfred, to Hale Fire Pump Company. Fuel supply for a rotary piston engine. 4,712,516, Cl. 123-1.00A.

Ebihara, Yuko: *See—*
Ohno, Sachio; Ebihara, Yuko; Mizukoshi, Kiyoshi; Ichihara, Kenji; Ban, Takao; and Nagasaka, Mitsuaki, 4,713,457, Cl. 546-67.000.

EC Erdolchemie GmbH: *See—*
Herwig, Jens; Norenberg, Hagen; Bergmann, Friedhelm; Stiller, Manfred; Schlemmermeyer, Horst; Schmidt, Wilfried; Straube, Hilmar; and Wolter, Helmut, 4,712,434, Cl. 73-864.630.

Eck, Jeffrey A.: *See—*
Cahill, Richard F.; Eck, Jeffrey A.; Schwantz, Gerald L.; Theriault, John P.; Turek, Philip A.; Udd, Eric; Wagoner, Raymond E.; and Wanser, Keith H., 4,712,306, Cl. 33-304.000.

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Bukoschek, Romuald L.; Eckel, Merowech; and Schroder, Johann, 4,712,386, Cl. 62-342.000.

Edgley, Richard, to Molex Incorporated. Edge board connector with positive board lock. 4,712,848, Cl. 439-327.000.

Edmonds, Anthony C. F.: *See—*
Chin, Chang-Hwa; Edmonds, Anthony C. F.; and Evans, Colin M., 4,713,232, Cl. 423-390.000.

Edward Weck & Co.: *See—*
Peters, Rudolph; Peters, Ronald; and Taylor, William, 4,712,549, Cl. 128-325.000.

Edwards Manufacturing, Inc.: *See—*
Fraley, Walter C., 4,712,799, Cl. 273-138.00A.

Edwards, Pansy S. Exercise machine. 4,712,791, Cl. 272-73.000.

Edwards, Wayne; Nation, Richard V.; and Tomkins, Keith A. Adhesively secured fastener. 4,712,957, Cl. 411-82.000.

EG&G, Inc.: *See—*
Hood, Donald W.; Johnson, John A.; and Smartt, Herschel B., 4,712,722, Cl. 228-104.000.

Egawa, Takashi; and Sano, Yoshiaki, to Oki Electric Industry Co., Ltd. Method of heat treatment for reduction of dislocation density near III-V substrate surface. 4,713,354, Cl. 437-22.000.

Egerdahl, Raymond H. Combined drop and broadcast spreader for granular material. 4,712,717, Cl. 222-252.000.

Eggerstedt, Paul: *See—*
Zievers, James F.; and Eggerstedt, Paul, 4,713,174, Cl. 210-233.000.

Eggert, Walter S., Jr.: *See—*
Freeman, Richard B.; Goetz, Charles W.; and Eggert, Walter S., Jr., 4,712,710, Cl. 220-414.000.

EGO Elektro Gerate Blanc u. Fischer: *See—*
Kicherer, Robert; Schreder, Felix; and Dorner, Leonhard, 4,713,527, Cl. 219-464.000.

Ehinger, Karl: *See—*
Eiermann, Kurt; and Ehinger, Karl, 4,713,729, Cl. 361-386.000.

Ehlers, D. M.; and Hopkins, Daniel N., to Mobil Oil Corporation. Method for scale reduction in off-shore platforms. 4,712,616, Cl. 166-266.000.

Ehrenhalt, Caradoc, to Easy Use Products, Inc. Easy squeeze nozzle holder. 4,712,766, Cl. 251-90.000.

Eickmann, Karl. Fluid handling elements and combustion engines. 4,712,381, Cl. 60-712.000.

Eidenschink, Rudolf; Krause, Joachim; Hittich, Reinhard; Poetsch, Eike; Scheuble, Bernhard; Weber, Georg; and Pohl, Ludwig, to Merck Patent Gesellschaft mit beschrankter Haftung. Nitrogen-containing heterocyclic compounds. 4,713,197, Cl. 252-299.610.

Eiermann, Kurt; and Ehinger, Karl, to Degussa Aktiengesellschaft Corporation. Device for avoiding local overheating on measuring transducers. 4,713,729, Cl. 361-386.000.

Eisai Co., Ltd.: *See—*
Hirama, Shinichi; Nishiyama, Toshio; Ohta, Youichi; Uzuka, Makoto; Tomita, Kenichi; Nakajima, Keisuke; and Furuse, Kazumaro, 4,713,397, Cl. 514-690.000.

Eisenmann, Gregg A.: *See—*
Mobley, Dewey F.; Warren, Janice M.; Barbrick, August; and Eisenmann, Gregg A., 4,713,026, Cl. 439-845.000.

Eisfeller, Richard C., to Davidson Textron Inc. Etching of vacuum metallized indium. 4,713,143, Cl. 156-655.000.

Ejiri, Takashi: *See—*
Ariizumi, Ryozo; and Ejiri, Takashi, 4,712,576, Cl. 437-270.000.

Ek, Matthew C., to Rockwell International Corporation. Drive shaft assembly. 4,713,146, Cl. 159-4.200.

Elad, Yigal: *See—*
Chet, Ilan; Sivan, Alex; and Elad, Yigal, 4,713,342, Cl. 435-254.000.

Elbe, Hans-Ludwig; and Holmwood, Graham, to Bayer Aktiengesellschaft. Process for the preparation of 5-acylpyrimidines. 4,713,456, Cl. 544-335.000.

Eldridge, Richard A., to ESAB Welding Products, Inc. Electronic potentiometer simulator. 4,713,521, Cl. 219-130.500.

Electric Power Development Co., Ltd.: *See—*
Ogawa, Takayuki; Ito, Hideaki; Kimura, Nsokazu; Ito, Hayami; Tatsumi, Shuhei; Takao, Shoichi; Suzuki, Nitaro; Watanabe, Takashi; Shinano, Kunizo; Kuwabara, Takashi; and Aoki, Kaoru, 4,712,742, Cl. 241-20.000.

Electricite de France (Service National): *See—*
Denis, Jean; and Decaudin, Jean-Michel, 4,713,552, Cl. 250-577.000.

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Loewen, Heinz; and Wenko, Wold, 4,712,299, Cl. 29-882.000.

Eli Lilly and Company: *See—*
Cohen, Marlene L.; Fuller, Ray W.; Garbrecht, William L.; and Whitten, Kathleen R., 4,713,384, Cl. 514-288.000.
Marzoni, Gifford P.; and Garbrecht, William L., 4,713,385, Cl. 514-288.000.
Michel, Karl H.; and Kastner, Ralph E., 4,713,331, Cl. 435-68.000.

Elliott, Michael; Janes, Norman F.; and Khambay, Bhupinder P. S., to National Research Development Corporation. Pesticides. 4,713,392, Cl. 514-464.000.

Ellis, Gwendolyn E.: *See—*
Arrendiell, Robert; and Ellis, Gwendolyn E., 4,712,927, Cl. 384-23.000.

Ellis, Roger H.; and Alyea, John W., to Luxtron Corporation. Multichannel fiber optic connector. 4,712,864, Cl. 350-96.220.

Elpatronic AG: *See—*
Opprecht, Paul; Urech, Werner; and Opprecht, Jurg, 4,712,960, Cl. 413-74.000.

Elter, Claus: *See—*
Schoening, Josef; and Elter, Claus, 4,713,213, Cl. 376-299.000.

Elverdam, Peter, to AB Volvo. Gearbox synchronizer. 4,712,662, Cl. 192-53.00F.

Emerson Electric Co.: *See—*
Adams, John T.; and Goodale, John B., 4,712,996, Cl. 431-20.000.

Emhart Industries, Inc.: *See—*
Clarkson, Bruce A.; Frere, Ronald J.; Loughlin, Thomas G.; Taylor, William W., Jr.; and Mongeau, Peter, 4,712,398, Cl. 70-276.000.
Williams, Reade; and Scott, Paul F., 4,713,536, Cl. 250-223.00B.

Emmenthal, Klaus-Dieter; and Neumann, Joachim, to Volkswagen Aktiengesellschaft. Distribution device for a two-phase flow. 4,712,581, Cl. 137-561.00A.

Emmer, Eric D., to Chrysler Motors Corporation. Tapered piston pin. 4,712,941, Cl. 403-151.000.

Empson, Geuane: *See—*
Hoover, Gary W.; Empson, Geuane; and Ashley, Bruce W., 4,712,326, Cl. 43-42.310.

Emura, Noriaki: *See—*
Okuzono, Shuichi; Tanaka, Tetsuo; Oda, Yasuhiro; Shintani, Takashi; and Emura, Noriaki, 4,713,083, Cl. 8-557.000.

Enderby, Ralph T.; Ferrer, Enrique; and Shepherd, Wayne P., to Motorola Inc. Varactor tuning circuit having plural selectable bias voltages. 4,713,631, Cl. 331-36.00C.

Endo, Hidetoshi: *See—*
Kuzuya, Fumio; and Endo, Hidetoshi, 4,713,376, Cl. 514-78.000.

Endo, Shigeki: *See—*
Yoshida, Masaaki; Endo, Shigeki; Kisanuki, Shigeru; and Kakuzen, Hideo, 4,713,107, Cl. 65-157.000.

Endrud, Douglas G.: *See—*
Davidson, Dale D.; and Endrud, Douglas G., 4,713,757, Cl. 364-200.000.

Energy Adaptive Grinding, Inc.: *See—*
Smith, Roderick L., 4,712,332, Cl. 51-103.0WH.

Energy Conversion Devices, Inc.: *See—*
Hanak, Joseph J., 4,713,492, Cl. 136-245.000.
Johncock, Annette; and Hudgens, Stephen J., 4,713,309, Cl. 430-65.000.
Ovshinsky, Stanford R., 4,713,493, Cl. 136-249.000.

Energy Research Corporation: *See—*
Farooque, Mohammad; and Novacco, Lawrence J., 4,713,303, Cl. 429-26.000.

Engineered Data Products, Inc.: *See—*
Price, Macy J.; Johnson, Mack E.; and Acker, Norman J., 4,712,842, Cl. 312-196.000.

Engles, Bruce E.: *See—*
Morton, Bruce L.; and Engles, Bruce E., 4,713,797, Cl. 365-208.000.

Enichem Sintesi S.p.A.: *See—*
Renzi, Fiorenzo; Rivetti, Franco; Romano, Ugo; and Gagliardi, Claudio, 4,713,433, Cl. 526-314.000.

Enichem S.p.A.: *See—*
Sisto, Alessandro; Verdini, Antonio S.; and Virdia, Antonino, 4,713,367, Cl. 514-17.000.

Eniricerche S.p.A.: *See—*
Sisto, Alessandro; Verdini, Antonio S.; Virdia, Antonino; De Luca, Giovanna; Di Stazio, Giovanni; and Politi, Vincenzo, 4,713,368, Cl. 514-18.000.

Ensci, Inc.: *See—*
Pinsky, Naum; and Alkaitis, Saulius A., 4,713,306, Cl. 429-218.000.

Ensslin, Frieder H., to Castle Company. Electrosurgical generator. 4,712,544, Cl. 128-303.140.

Enstrom, Hans. Blood lancing device. 4,712,548, Cl. 128-314.000.

Eppendorf Geratebau Netheler & Hinz GmbH: *See*—
Gerken, Hero; and Gora, Heinz-Jurgen, 4,713,219, Cl. 422-102.000.
Epstein, Ronald A., to Stauffer Chemical Company. Single phase carbonylation of aromatic halides to carboxylic acid salts. 4,713,484, Cl. 562-406.000.
Erdei, Karoly. Dome slab building structure and method. 4,712,344, Cl. 52-223.00R.
Erdman, Timothy R., to Chevron Research Company. Modified carboxylic amide dispersants. 4,713,190, Cl. 252-51.50A.
Erie, David G.; Roberts, Jon A.; and Lee, Eddie C., to Honeywell Inc. Dielectric barrier material. 4,713,682, Cl. 357-54.000.
Erndt, Hans; Link, Erich; Martin, Adolf; Palloch, Herbert; and Wittler, Hilmar, to Frankl & Kirchner GmbH & Co KG. Electromotive variable-speed and control drive particularly for use in industrial sewing machines. 4,712,660, Cl. 192-18.00B.
Ernst Leitz Wetzlar GmbH: *See*—
Crema, Rolf, 4,712,897, Cl. 354-219.000.
Schaefer, Klaus-Dieter, 4,712,903, Cl. 354-433.000.
ESAB Welding Products, Inc.: *See*—
Eldridge, Richard A., 4,713,521, Cl. 219-130.500.
Esopi, Aldo. Reversible mailbox signaling device. 4,712,732, Cl. 232-35.000.
Essig, Daniel L.: *See*—
Magar, Surendar S.; Essig, Daniel L.; Simpson, Richard D.; and Caudel, Edward R., 4,713,748, Cl. 364-200.000.
Magar, Surendar S.; and Essig, Daniel L., 4,713,749, Cl. 364-200.000.
Essig, Willi; Mayer, Hans; and Mannuss, Siegfried, to E.G.O. Elektro-Gerate Blanc u. Fischer. Controller for controlling electrical heaters. 4,713,502, Cl. 200-61.820.
ETA Systems, Inc.: *See*—
Sullivan, Daniel C.; and Mazorol, Earl A., Jr., 4,712,388, Cl. 62-514.00R.
Etablissement Public de Diffusion dit "Telediffusion de France": *See*—
Veillard, Jacques, 4,713,689, Cl. 358-146.000.
Etablissements Morel - Ateliers Electromecaniques de Favieres: *See*—
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Etablissements Pompes Guinard: *See*—
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Etablissment Public Telediffusion de France: *See*—
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Charbrol, Jean-Jacques; and Lambert, Jean-Pierre, 4,712,830, Cl. 297-42.000.
Etude et Development en Metallurgie: *See*—
Merrien, Pierre L.; and Merrien, Pierre A., 4,712,601, Cl. 164-150.000.
Evans, Archibald D.: *See*—
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Evans, Colin M.: *See*—
Chin, Chang-Hwa; Edmonds, Anthony C. F.; and Evans, Colin M., 4,713,232, Cl. 423-390.000.
Evans, Harold J.: *See*—
Inhofe, James A., Jr.; and Evans, Harold J., 4,713,129, Cl. 156-71.000.
Evans, Richard B., to Red Man Pipe and Supply Company. Orifice plate holder. 4,712,585, Cl. 138-44.000.
Evans, Robert D.; and Blezard, Robert C., to Amesbury Industries, Inc. Tufting process and apparatus for manufacturing weatherstripping. 4,713,130, Cl. 156-72.000.
Eversole, Brad K.: *See*—
Birkenbach, Eugen J.; Eversole, Brad K.; and Magee, Kevin J., 4,712,622, Cl. 172-328.000.
Eves, Harold J. Baby changing mat. 4,712,258, Cl. 5-424.000.
Ex-Cell-O Corporation: *See*—
Johnson, D. Dale, 4,712,471, Cl. 92-24.000.
McDonald, Kenneth P.; Rangwala, Badruddin K.; Owen, Barry C.; and Rodocker, Frank A., 4,712,665, Cl. 198-346.200.
Express Communications, Inc.: *See*—
Schultz, Thomas G.; Gross, Andrew; Pappas, Barbara; Shifrin, George D.; and Mack, Lois, 4,713,780, Cl. 364-514.000.
Exxon Chemical Patents Inc.: *See*—
Tack, Robert D.; and Pearce, Sarah L., 4,713,088, Cl. 44-62.000.
Tegge, Bruce R.; Weary, Frank G.; and Sakaguchi, Yasuo, 4,713,413, Cl. 525-54.000.
Exxon Research and Engineering Company: *See*—
Baker, James K., 4,713,778, Cl. 364-513.500.
Klovstad, John W.; Lee, Chin-Hui; and Ganesan, Kalyan, 4,713,777, Cl. 364-513.500.
Eyuboglu, Vedat M., to Codex Corporation. Coded modulation system with a simplified decoder capable of reducing the effects of channel distortion. 4,713,829, Cl. 375-37.000.
Ezer, Elemer; Harsanyi, Kalman; Petho, Hajnalka V.; Matuz, Judit; Szporny, Laszlo; Cholnoky, Eszter; Kuthi, Csaba; Trischler, Ferenc; Hegedus, Bela; Kapolnas, Marta; and Kallay, Anna, to Richter Gedeon Vegyeszeti Gyar Rt. Certain 3- or 4-benzoyl-2-[(2-aminoethyl)thio-pyridines] and their anti-ulcer properties. 4,713,388, Cl. 514-346.000.
Facet Enterprises, Inc.: *See*—
Losey, Walter N.; and Giometti, Paul F., 4,712,435, Cl. 74-6.000.
Facom: *See*—
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Fahr-Bucher GmbH: *See*—
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Fairchild Camera & Instrument Corporation: *See*—
Damouny, Nabil G.; Huang, Min-Siu; Wilnai, Dan; and Mor, Yeshayahu, 4,713,750, Cl. 364-200.000.
Fairchild Semiconductor Corporation: *See*—
Herndon, William H., 4,713,560, Cl. 307-455.000.
Faivre, John D.: *See*—
Catiller, Robert D.; Faivre, John D.; and Rakpongs, Fah, 4,713,608, Cl. 324-142.000.
Fallier, Charles N., Jr.: *See*—
Byszewski, Wojciech W.; Fallier, Charles N., Jr.; and Lester, James N., 4,713,587, Cl. 315-289.000.
Fan Out Co., Ltd.: *See*—
Yamaki, Chikara, 4,712,266, Cl. 15-167.100.
Fanelli, Anthony J.: *See*—
Marsh, Gary B.; Fanelli, Anthony J.; Armor, John N.; and Zambri, Patrick M., 4,713,233, Cl. 423-608.000.
Fang, Robert; Wang, Jerry; Liang, Victor; Farb, Joseph; and Hsu, Chung, to Data General Corporation. Well mask for CMOS process. 4,713,329, Cl. 437-29.000.
Fanuc Ltd.: *See*—
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Nakashima, Seiichiro; Toyoda, Kenichi; Inagaki, Shigemi; and Otsuka, Kazuhisa, 4,712,972, Cl. 414-744.00R.
Farb, Joseph: *See*—
Fang, Robert; Wang, Jerry; Liang, Victor; Farb, Joseph; and Hsu, Chung, 4,713,329, Cl. 437-29.000.
Farmitalia Carlo Erba S.p.A.: *See*—
Alpegiani, Marco; Bedeschi, Angelo; Foglio, Maurizio; Franceschi, Giovanni; and Perrone, Ettore, 4,713,450, Cl. 540-214.000.
Perrone, Ettore; Alpegiani, Marco; Zarini, Franco; Bruna, Costantino D.; and Franceschi, Giovanni, 4,713,378, Cl. 514-192.000.
Farooque, Mohammad; and Novacco, Lawrence J., to Energy Research Corporation. Fuel cell apparatus with rapid start-up. 4,713,303, Cl. 429-26.000.
Farthing, Denis, to Gulf Eastern Manufacturing Company. Car carrier assembly. 4,712,967, Cl. 414-563.000.
Fausone, Alfredo: *See*—
Ambrosio, Renato; Brosio, Alberto; Fausone, Alfredo; and Tofanelli, Adler, 4,713,803, Cl. 370-32.100.
Fayter, Richard G., Jr., to National Distillers and Chemical Corporation. Process for the preparation of dialkyl 2-vinylcyclopropane-1,1-dicarboxylates. 4,713,478, Cl. 560-124.000.
Fayter, Richard G., Jr.: *See*—
Clark, Clarence E., Jr.; and Fayter, Richard G., Jr., 4,713,479, Cl. 560-124.000.
Fehlhaber, Hans-Wolfram: *See*—
Aretz, Werner; Berscheid, Hans G.; Huber, Gerhard; Fehlhaber, Hans-Wolfram; Kraemer, Hans P.; Sedlacek, Hans-Harald; Ganguli, Bimal N.; Sood, Ratan S.; Gandhi, Julia; and Reddy, Gauknapalli C., 4,713,371, Cl. 514-34.000.
Fennekels, Peter; Waltmann, Ernst; and Schumacher, Walter, to Girmes-Werke AG. Heating element for textiles. 4,713,531, Cl. 219-545.000.
Ferguson, Larry W.: *See*—
Phelan, James J.; and Ferguson, Larry W., 4,713,799, Cl. 367-140.000.
Ferrer, Enrique: *See*—
Enderby, Ralph T.; Ferrer, Enrique; and Shepherd, Wayne P., 4,713,631, Cl. 331-36.00C.
Ferrer, Fernando F. Process for the manufacture of reinforced false twist yarns. 4,712,365, Cl. 57-12.000.
Feterl, Leon G., to Core Industries Inc. Material mixing apparatus. 4,712,922, Cl. 366-288.000.
Feuerbaum, Hans-Peter; Frosien, Juergen; and Spehr, Rainer, to Siemens Aktiengesellschaft. Scanning particle microscope. 4,713,543, Cl. 250-310.000.
Feunten, Pierre: *See*—
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Fey, Rainer; and Dumbser, Gerhard, to Fichtel & Sachs AG. Electromagnetic brake device for a sports training apparatus. 4,713,567, Cl. 310-105.000.
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Ficht GmbH: *See*—
Ficht, Reinhold; and Vilsmeier, Walter, 4,712,780, Cl. 267-256.000.
Ficht, Reinhold; and Vilsmeier, Walter, to Ficht GmbH. Hydropneumatic spring suspension device. 4,712,780, Cl. 267-256.000.
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Fey, Rainer; and Dumbser, Gerhard, 4,713,567, Cl. 310-105.000.
Fidia, S.p.A.: *See*—
della Valle, Francesco; and Romeo, Aurelio, 4,713,374, Cl. 514-54.000.
Fierkens, Richardus H. J.; and Pas, Ireneus J. T. M., to ASM Fico Tooling, b.v. Apparatus for cold runner transfer molding. 4,712,994, Cl. 425-543.000.
Fildan, Gerhard. Strap fastener. 4,712,280, Cl. 24-625.000.
Filippuzzi, Fabiola: *See*—
De Lucchi, Ottorino; Filippuzzi, Fabiola; Modena, Giorgio; and Camera, Ettore, 4,713,466, Cl. 549-464.000.
Findlay, John B.; Wu, Annie L.; and Norton, Gary E., to Eastman Kodak Company. Determination of total creatine kinase or an isoenzyme with a multilayer analytical element. 4,713,327, Cl. 435-17.000.

Finger, Stephen N., to United States of America, Air Force. Self-retained platform cooling plate for turbine vane. 4,712,979, Cl. 416-96.00R.

Finter, Jurgen: *See*—
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Geno, Wayne H.; and Weitzenhof, David A., 4,712,776, Cl. 267-64.210.
Hayes, Robert A.; and Conard, Wendell R., 4,713,409, Cl. 524-518.000.

Firth, John F.: *See*—
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Fischer, Artur. Device for injecting a fixing agent into a drilled hole for anchoring a fastening element inserted in a drilled hole. 4,712,715, Cl. 222-145.000.

Fischer, Francis: *See*—
Kristen, Ulrich; Haring , Ulrich; Fischer, Francis; and Cron, Alain, 4,713,186, Cl. 252-30.000.

Fischman, Harry H. Tamper resistant bottle. 4,712,700, Cl. 215-366.000.

Fitz, Edward J.; and Pesapane, Dominic, to Casco Products Corporation. Cigar lighter incorporating glow ring. 4,713,733, Cl. 362-80.000.

Flakt AB: *See*—
Gustavsson, Lennart, 4,712,277, Cl. 19-296.000.

Flanagan, Thomas P.: *See*—
Beh-Forrest, Eric; and Flanagan, Thomas P., 4,712,808, Cl. 281-15.00R.

Flesser, Brian D.: *See*—
Sharpe, Murem S.; Bryson, Eugene; Manduley, Flavio; Riordan, Eben M., II; and Flesser, Brian D., 4,713,761, Cl. 364-406.000.

Fletcher, Taylor C. Digital temperature indicating system. 4,713,783, Cl. 364-557.000.

Flick, Robert H.; Dennis, Lawrence D.; and Walker, Roger E., to Westinghouse Electric Corp. Multi-phase circuit breaker with inter-phase barrier retention. 4,713,635, Cl. 335-8.000.

Florida Development and Manufacturing, Inc.: *See*—
Saibic, Darryl S., 4,713,170, Cl. 210-85.000.

Flotow, Richard A., to Dana Corporation. Adjustable clutch brake apparatus. 4,712,659, Cl. 192-13.00R.

Fluckiger, Rudolf: *See*—
Gallop, Paul M.; Henson, Edward; and Fluckiger, Rudolf, 4,713,346, Cl. 436-86.000.

Fluid Mechanics: *See*—
Truitt, Robert B.; and Junius, V. Bruce, 4,713,159, Cl. 204-197.000.

FMC Corporation: *See*—
Crawford, Donald C.; Ross, Jeffrey L.; Strike, Gary P.; and Mory, Steven W., 4,712,357, Cl. 53-450.000.
Shute, Jonathan F.; and Rosenhouse, Harvey, 4,713,228, Cl. 423-317.000.
Sogge, John, 4,712,340, Cl. 52-177.000.

FMR Corporation: *See*—
Viggiano, Frank, 4,712,262, Cl. 5-508.000.

Foglio, Maurizio: *See*—
Alpegiani, Marco; Bedeschi, Angelo; Foglio, Maurizio; Franceschi, Giovanni; and Perrone, Ettore, 4,713,450, Cl. 540-214.000.

Fonas, Kenneth. Simulated gift wrap box. 4,712,726, Cl. 229-8.000.

Fong, Dodd W.; and Halverson, Ann M., to Nalco Chemical Company. Dewatering agents. 4,713,178, Cl. 210-734.000.

Food Machinery Sales, Inc.: *See*—
Hardage, Timothy W.; Haley, Charles T.; and Walker, William D., 4,712,356, Cl. 53-446.000.

Ford, John R., to Vernay Laboratories, Inc. Inverted flow marine engine exhaust muffler. 4,713,029, Cl. 440-89.000.

Ford Motor Company: *See*—
Grawi, Franklin L.; and Magnan, Michael B., 4,713,097, Cl. 55-276.000.
Hansen, Charles A., 4,712,445, Cl. 74-491.000.
Harris, Charles F., Jr.; and Coleman, James C., 4,712,341, Cl. 52-208.000.
Hurten, Oskar; and Vogt, Hans, 4,712,829, Cl. 296-203.000.
Stockton, Thomas R., 4,713,041, Cl. 474-28.000.

Ford, Warren T.: *See*—
Mohanraj, Subramaniam; and Ford, Warren T., 4,713,423, Cl. 525-351.000.

Fore-Sight Golf, Inc.: *See*—
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Fork, Inc.: *See*—
Rapp, Edward J., 4,713,787, Cl. 364-717.000.

Formica Corporation: *See*—
Taylor, Arthur R.; and Wulfekotter, Dudley, 4,713,299, Cl. 428-526.000.

Forney, Edgar W., Jr.; and Hogendobler, Richard S., to AMP Incorporated. Method of constructing a coaxial connector. 4,712,296, Cl. 29-828.000.

Forster, Rudolf; Weber, Suso; and Pyka, Hans-Jurgen, to Licentia Patent-Verwaltungs GmbH. Method of producing a transparent photocathode. 4,713,353, Cl. 437-2.000.

Fortel Corporation: *See*—
Bond, Raymond G.; and Mock, Gerald L., 4,713,835, Cl. 379-79.000.

Foster, Raymond K. Combined linear hydraulic motor and transfer valve. 4,712,467, Cl. 91-176.000.

Foster Wheeler Energy Corporation: *See*—
Idvorian, Nick; and Renshaw, Robert H., 4,713,098, Cl. 55-345.000.
Seshamani, Venkatraman; and Money, Dudley P., 4,712,938, Cl. 403-24.000.

Fowler, Eugene C.: *See*—
Nash, William H.; and Fowler, Eugene C., 4,713,644, Cl. 337-158.000.

Fowler, Ronald B. Ringed impeller for a water jet drive. 4,713,027, Cl. 440-47.000.

Fox, Duke. Means for and methods of controlling ornithopters. 4,712,749, Cl. 244-22.000.

Fox, John P.; Hedaya, Eddie; and Lippman, Violet, to Technicon Instruments Corporation. Inverted latency specific binding assay. 4,713,324, Cl. 435-4.000.

Foxboro Company, The: *See*—
Gilby, Anthony C.; and Ihnat, Dale E., 4,713,540, Cl. 250-231.00R.

Fraley, Walter C., to Edwards Manufacturing, Inc. Multi-screen video gaming device and method. 4,712,799, Cl. 273-138.00A.

Frame, Charles W.: *See*—
Crout, Charles J.; Frame, Charles W.; and Harris, Ronald N., 4,712,404, Cl. 72-8.000.
Crout, Charles J.; Frame, Charles W.; and Harris, Ronald N., 4,712,405, Cl. 72-19.000.
Crout, Charles J.; Frame, Charles W.; and Harris, Ronald N., 4,712,415, Cl. 72-8.000.

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Francis, John E.; and Gelotte, Karl O., to Ciba-Geigy Corporation. Triazoloquinazoline compounds, and their methods of preparation, pharmaceutical compositions, and uses. 4,713,383, Cl. 514-267.000.

Frank, Wolfgang, to TAA Technique and Administration AG. Sailboards and surfboards as well as manufacturing process thereof. 4,713,032, Cl. 441-74.000.

Frankl & Kirchner GmbH & Co KG: *See*—
Erndt, Hans; Link, Erich; Martin, Adolf; Palloch, Herbert; and Wittler, Hilmar, 4,712,660, Cl. 192-18.00B.

Franklin, Duane R.; Evans, Archibald D.; and Hansen, Walter J., to Lift-R Technologies, Inc. Energy-recycling scissors lift. 4,712,653, Cl. 187-18.000.

Frankovich, Robert J.: *See*—
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Frazier, Kevin A.; and Renga, James M., to Dow Chemical Company, The. Preparation of ethenylidenes. 4,713,458, Cl. 546-115.000.

Freedman, Melvin S., to Avery International Corporation. Composite facestocks and liners. 4,713,273, Cl. 428-40.000.

Freeman, Richard B.; Goetz, Charles W.; and Eggert, Walter S., Jr., to Budd Company, The. One-piece seamless enclosure and methods of making it. 4,712,710, Cl. 220-414.000.

Freeze Control Pty. Ltd.: *See*—
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Freilich, Alfred: *See*—
Bose, Debasis; and Freilich, Alfred, 4,712,603, Cl. 164-463.000.

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French, James C.: *See*—
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French, Richard C.: *See*—
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French, Steven J.; and Neasham, David L., to Thorn Emi Electronics Limited. Electrical apparatus. 4,713,652, Cl. 340-652.000.

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Clarkson, Bruce A.; Frere, Ronald J.; Loughlin, Thomas G.; Taylor, William W., Jr.; and Mongeau, Peter, 4,712,398, Cl. 70-276.000.

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Fried. Krupp Gesellschaft mit beschrankter Haftung: *See*—
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Friel, Joseph V.: *See*—
Hiltz, Ralph H.; Greer, John S.; and Friel, Joseph V., 4,713,182, Cl. 252-3.000.

Fries, Wolfgang: *See*—
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Fritz Chemical Company: *See*—
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Froom, Thomas W. Ice-cream carton, carton blank, and method of erecting same. 4,712,689, Cl. 206-626.000.

Froom, Thomas W. Ice-cream carton, carton blank, and method of erecting same. 4,712,730, Cl. 229-169.000.

Frosien, Juergen: *See*—
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Frost, Charles E., Jr.: *See*—
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Fry, John A., to Quaker Industries, Inc. Home filing cabinet. 4,712,844, Cl. 312-265.000.
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Fuji Electric Co., Ltd.: *See*—
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Aono, Toshiaki; and Hara, Hiroshi, 4,713,319, Cl. 430-567.000.
Arakawa, Satoshi; and Nonomura, Masamitu, 4,713,549, Cl. 250-484.100.
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Masaki, Kouichi; and Kitamoto, Tatsuji, 4,713,261, Cl. 427-129.000.
Mifune, Hiroyuki; Shishido, Tadao; and Suzuki, Yoshiaki, 4,713,321, Cl. 430-569.000.
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Sugimoto, Tadao; and Hayakawa, Toshiaki, 4,713,318, Cl. 430-567.000.
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Fujimori, Hiroyoshi; and Nagasaki, Tatsuo, to Olympus Optical Co., Ltd. Illuminating and synchronizing device for color imaging equipment. 4,713,683, Cl. 358-42.000.
Fujimoto, Nobuaki, to Kitagawa Industries Co., Ltd. Substrate support of integral construction. 4,712,939, Cl. 403-24.000.
Fujino, Hirohisa: *See*—
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Fujisawa, Masayasu, to Hitachi, Ltd. Method and apparatus for severing wafers. 4,712,535, Cl. 125-13.00R.
Fujishima, Shizu; Yaku, Fumiko; and Koshijima, Tetsuo, to Agency of Industrial Science and Technology. Process for the saccharification of celluloses. 4,713,334, Cl. 435-99.000.
Fujita, Tsuyoshi: *See*—
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Nakamura, Haruhiko; and Tempaku, Junya, 4,713,621, Cl. 328-55.000.
Shirasaki, Masataka, 4,712,880, Cl. 350-377.000.
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Fuller, Kevin S. Submerged bobber release device for fishing rods and the like. 4,713,031, Cl. 441-8.000.
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Fumagalli, Carlo; and Stefani, Giancarlo, to Alusuisse Italia, S.p.A. Process for production of maleic anhydride. 4,713,464, Cl. 549-259.000.
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Funk, Gary L.; and Bard, William B., to Phillips Petroleum Company. Alkylation reactor quality control. 4,713,774, Cl. 364-500.000.
Furrer, Harald; Anagnostopulos, Hiristo; and Gebert, Ulrich, to Hoechst Aktiengesellschaft. Cyclic derivatives of alkyl dihydroxyalkylxanthenes. 4,713,455, Cl. 544-267.000.
Furth, Harold P.; Janos, Alan C.; Uyama, Tadao; and Yamada, Masaaki, to United States of America, Energy. Spheromak reactor with poloidal flux-amplifying transformer. 4,713,208, Cl. 376-137.000.
Furuse, Kazumaro: *See*—
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Fusek, Richard L.; and Lin, Lawrence H., to Insystems, Inc. Positioning alignment apparatus and method using holographic optical elements. 4,712,851, Cl. 350-3.600.
Fyler, Donald C., to Charles Stark Draper Laboratory, Inc., The. Control arm assembly. 4,712,971, Cl. 414-744.00R.
G-C Dental Industrial Corporation: *See*—
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Gaetani, Frank J.: *See*—
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Gagliardi, Claudio: *See*—
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Gal, Jean-Yves; Chiapello, Jean-Michel; Peyrot, Martial; and Tourneux, Etienne . Process for regulating an electro-dialyzer and improved electrodialysis apparatus. 4,713,156, Cl. 204-182.400.
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Gallop, Paul M.; Henson, Edward; and Fluckiger, Rudolf, to Children's Medical Center Corporation, The. Formation of analyzable boron containing adducts. 4,713,346, Cl. 436-86.000.
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Gansert, Willi; Lochbrunner, Eduard; and Slansky, Harry, to Robert Bosch GmbH. Trigger mechanism construction for an automotive passenger restraint system. 4,713,573, Cl. 310-329.000.
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Marzoni, Gifford P.; and Garbrecht, William L., 4,713,385, Cl. 514-288.000.
Garcia, Joseph T. Collapsible sailboard dolly. 4,712,803, Cl. 280-47.13B.
Garden, Robert L. Ball dispensing apparatus and method. 4,712,712, Cl. 221-68.000.

Gardner, Neal F., to TRW Inc. Bipolar transistor construction. 4,713,355, Cl. 437-31.000.
Garin, John; Riggs, Allan J.; and Palmer, Robert S., to Westinghouse Electric Corp. Two servo axis, AC powered robot wrist. 4,712,973, Cl. 414-744.00A.
Garner, John N., to Northern Telecom Limited. Manufacture of telecommunications cable core units. 4,712,368, Cl. 57-314.000.
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Garson, Arthur, Jr., to Baylor College of Medicine. Electronic system to distinguish between sinus and nonsinus atrial depolarizations which do not stimulate ventricular depolarizations in response to nonsinus atrial depolarizations. 4,712,554, Cl. 128-419.0PG.
Gartner, Georg F.; Janiel, Peter A.; and Lydtin, Hans-Jurgen, to U.S. Philips Corporation. Method for the glow-discharge-activated reactive deposition of electrically conductive material from a gaseous phase. 4,713,259, Cl. 427-39.000.
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Gaskill, Garold B.; Park, Daniel J.; Rullman, Robert G.; Rose, Donald T.; Stiley, Joseph F., III; Barnum, Lewis W.; and Hoff, Don G., to A T & E Corporation. Watch pager system and communication protocol. 4,713,808, Cl. 370-94.000.
Gatti, John E.; and Tarver, Carl R., to Motorola Computer Systems, Inc. Computer peripheral shock mount for limiting motion-induced errors. 4,713,714, Cl. 360-137.000.
Gaudreau, Charles H., Jr. Aquatic exercise apparatus. 4,712,788, Cl. 272-69.000.
Gaydon Technology Limited: *See*—
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Gaynor, Edwin. Sockets for compact fluorescent lamps. 4,713,019, Cl. 439-232.000.
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Gelotte, Karl O.: *See*—
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Gely, Jean-Marie L.; Goutines, Marius J.; and Meauze, Geordes, to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "S.N.E.C.M.A.". Fairing for turbo-jet engine fan leading edge. 4,712,980, Cl. 416-224.000.
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Losapio, Peter F.; Germer, Warren R.; Ouellette, Maurice J.; and Palmer, Ansell W., 4,713,609, Cl. 324-156.000.
Raabe, Rodney D.; Mrowka, Joseph J.; McCuin, Jon P.; and Noonan, Joseph F., 4,713,728, Cl. 361-363.000.
Schaefer, Daniel J.; and Belt, Kenneth W., 4,712,560, Cl. 128-653.000.
Wojciechowski, Charles R., 4,713,546, Cl. 250-374.000.
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General Motors Corporation: *See*—
Lederman, Frederick E.; and King, Donald J., 4,712,661, Cl. 192-45.000.
Geno, Wayne H.; and Weitzenhof, David A., to Firestone Tire & Rubber Company, The. Air spring suspension system. 4,712,776, Cl. 267-64.210.
Georg Fischer Aktiengesellschaft: *See*—
Hofmann, Franz; Trapp, Hans G.; Rietzscher, Rolf; Otto, Jurgen; Kaettlitz, Wolfgang; and Trinki, Gerd, 4,713,180, Cl. 210-773.000.
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Geotech Engineering: *See*—
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Kosakowski, Alex S.; and Lundqvist, Mats A., 4,712,915, Cl. 356-152.000.
Gerasimova, Galina A.: *See*—
Babaian, Eduard A.; Gerasimova, Galina A.; Davydov, Anatoly B.; Utyamyshev, Rustam I.; Khromov, Gennady L.; Metelitsa, Vladimir I.; Vikhert, Anatoly M.; Savvateev, Konstantin L.; Piotrovsky, Vladimir K.; and Novikova, Elizaveta B., 4,713,239, Cl. 424-81.000.
Gerber Garment Technology, Inc.: *See*—
Nymark, Roald P., 4,712,485, Cl. 104-172.400.
Gerber, James R. Leg rest for below knee amputee. 4,712,836, Cl. 297-429.000.
Gerfast, Sten R. Axial fan. 4,712,977, Cl. 415-209.000.
Gerken, Hero; and Gora, Heinz-Jurgen, to Eppendorf Gerstebau Netheler & Hinz GmbH. Plastic reaction vessel. 4,713,219, Cl. 422-102.000.
German, Harold W.: *See*—
Tonyes, Henry J.; Keehn, William T.; German, Harold W.; and Hill, Brian S., 4,713,250, Cl. 426-2.000.
Germer, John H., to General Electric Company. Control rod driveline and grapple. 4,713,210, Cl. 376-233.000.
Germer, Warren R.: *See*—
Losapio, Peter F.; Germer, Warren R.; Ouellette, Maurice J.; and Palmer, Ansell W., 4,713,609, Cl. 324-156.000.
Gettleman, Carl. Hands free portable hair dryer holder. 4,712,313, Cl. 34-97.000.
Getty Scientific Development Company: *See*—
Vanderslice, Rebecca W.; and Shannon, Patrick, 4,713,449, Cl. 536-123.000.
Ghisoni, Emilio. Semiautomatic operation revolving cylinder pistol. 4,712,466, Cl. 89-157.000.
Gianfilippo, Aleandro Di, to Baxter Travenol Laboratories, Inc. Electrical connection means for multiple bulk compounding systems. 4,712,590, Cl. 141-83.000.
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Del Giudice, Luciano; Nocci, Roberto; Giannini, Umberto; and Gianotti, Giuseppe, 4,713,416, Cl. 525-68.000.
Gianotti, Giuseppe: *See*—
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Schmetz, Peter; and Gierse, Dieter, 4,713,124, Cl. 148-128.000.
Gies, Jakob. Tree stand having a casting with clamping devices for holding a tree trunk. 4,712,328, Cl. 47-40.500.
Giezeman, Paulus G.; and Romualdus Ter Horst, Gerhardus E., to OCE-Nederland B.V. Exposure device for sheets. 4,713,674, Cl. 355-14.0SH.
Gilby, Anthony C.; and Ihnat, Dale E., to Foxboro Company, The. Method and apparatus for sensing a measurand. 4,713,540, Cl. 250-231.00R.
Gill, David C., to Nomix Manufacturing Co. Limited. Spraying equipment. 4,712,738, Cl. 239-74.000.
Gille, Henrick K.; Willing, Richard S.; Bloom, William G.; Siegel, Bernard; Cheung, Tsang; Lobodzinski, Richard; and Gilroy, Keith, to American Hospital Supply Corporation. Liquid meter assembly. 4,712,567, Cl. 128-771.000.
Gilman, Keith; and Lutz, Bruce W., to Intertech Resources Inc. Exhalation valve assembly. 4,712,580, Cl. 137-512.150.
Gilroy, Keith: *See*—
Gille, Henrick K.; Willing, Richard S.; Bloom, William G.; Siegel, Bernard; Cheung, Tsang; Lobodzinski, Richard; and Gilroy, Keith, 4,712,567, Cl. 128-771.000.
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Girmes-Werke AG: *See*—
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Giroux, Richard L.: *See*—
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Glacier Products, Inc.: *See*—
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Glover, John D.: *See*—
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Goedderz, Stanley J., Sr. Removable culvert grate. 4,713,179, Cl. 210-747.000.
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Goff, Claude W., Sr.: *See*—
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Goldman, Jerome; Goldman, Marvin; and Goldman, Terry, to Penn Plax Plastics, Inc. Three element aquarium filter cartridge. 4,713,173, Cl. 210-169.000.
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Goldman, Jerome; Goldman, Marvin; and Goldman, Terry, 4,713,173, Cl. 210-169.000.
Goldman, Terry: *See*—
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Gollhardt, Bradley J.: *See*—
Broaddus, Clarke R.; and Gollhardt, Bradley J., 4,712,988, Cl. 425-725.000.
Gonzalez Oliver, Carlos J. R.; De Pous, Olivier; and Schneider, Michel, to Battelle Memorial Institute. Porous spherical glass filtrating beads and method for the manufacturing thereof. 4,713,338, Cl. 435-176.000.
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Goodrich, Judson E., to Chevron Research Company. Method for producing industrial asphalts without air-blowing using an organic sulfonic acid. 4,713,117, Cl. 106-273.00R.
Goodwin, Roy S., to Clevite Industries Inc. Apparatus for making a forged metal article. 4,712,411, Cl. 72-344.000.
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Goras, Anders: *See*—
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Gordon, Alastair. Communication network. 4,713,837, Cl. 379-93.000.
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Gordon, Philip J.: *See*—
Remz, Harvey M.; Gordon, Philip J.; Cunningham, John D.; and Melnik, Joseph D., 4,712,571, Cl. 132-88.700.
Goria, Luigi. Footwear with detachable visibility aids. 4,712,319, Cl. 36-137.000.
Gorski, George L.: *See*—
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Gorton, Lanny A.: *See*—
Pelmulder, John P.; Gorton, Lanny A.; Guleserian, Armen J.; and Livingston, John H., 4,712,583, Cl. 137-852.000.
Gosselink, Eugene P., to Procter & Gamble Company, The. Block polyester and like compounds having branched hydrophilic capping groups useful as soil release agents in detergent compositions. 4,713,194, Cl. 252-174.230.
Goto, Tsugio: *See*—
Aikou, Kenichi; Kurihara, Yoichi; and Goto, Tsugio, 4,712,477, Cl. 102-206.000.
Gotoh, Hajime; Machida, Mamoru; and Sugiyama, Osamu, to Mitsubishi Rayon Co., Ltd. Paper-like product, method and apparatus for production thereof and prepreg formed of said paper-like product. 4,713,276, Cl. 428-113.000.
Gotou, Makoto; Mitani, Hiroshi; and Igarashi, Yoshiaki, to Matsushita Electric Industrial Co., Ltd. Camera apparatus. 4,713,697, Cl. 358-222.000.
Goutines, Marius J.: *See*—
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Govind, Rakesh, to University of Cincinnati. Adsorption of gases by amine and phosphine complexed Mn(II) and compounds. 4,713,091, Cl. 55-73.000.
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Jarman, Davis R.; and Hinson, Virgil H., 4,712,417, Cl. 72-447.000.
Graciotti, Alessandro; and Kutscha, Herbert A., to Ing.C. Olivetti & Co. S.p.A. Video converter. 4,713,779, Cl. 364-521.000.
Gradl, Reinhard: *See*—
Schimmel, Gunther; and Gradl, Reinhard, 4,713,229, Cl. 423-321.00R.
Graf, Felix; Schneeberger, Ruedi; and Symon, Georg, to Rieter Machine Works Limited. Method and apparatus for forming cross-wound packages. 4,712,746, Cl. 242-43.00R.
Graf, Felix: *See*—
Sommer, Hans-Jorg; Mutter, Heinz; Wirz, Armin; and Graf, Felix, 4,713,655, Cl. 340-677.000.
Grage, Ludger, to Siemens Aktiengesellschaft. Optical system for the simultaneous reception of thermal and laser radiation. 4,713,544, Cl. 250-334.000.
Grahar Valker O. Cleaning and yarn conditioning system for weaving machines. 4,712,587, Cl. 139-1.00C.
Grain Processing Corporation: *See*—
Ramsden, Steven L., 4,713,345, Cl. 435-305.000.
Gramelspacher, George W. Mail box structure. 4,712,731, Cl. 232-17.000.
Gramling William D. Pressure-operated valving for oil and gas well swabs. 4,712,981, Cl. 417-56.000.
Grandjean, Richard, to Compagnie Industrielle de Mecanismes en abrege C.I.M. Door latch assembly, in particular for an automobile vehicle. 4,712,817, Cl. 292-336.300.
Grano, Frank J.: *See*—
Geering, Emil J.; and Grano, Frank J., 4,712,711, Cl. 220-457.000.
Grassauer, Willie K.: *See*—
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Graviner Limited: *See*—
Spring, David J., 4,713,101, Cl. 62-8.000.
Grawi, Franklin L.; and Magnan, Michael B., to Ford Motor Company. Integrated engine air cleaner and venturi resonator. 4,713,097, Cl. 55-276.000.
Gray, John D.: *See*—
Triplett, Charles S.; and Gray, John D., 4,712,348, Cl. 52-408.000.
Gray, Ralph. Flight for use on a conveyor belt. 4,712,668, Cl. 198-698.000.
Greatorex, Cyril B.; Smith, Ian W. H.; and Hammersley, Graham J., to Stanton plc. Assembly and installation of pipes. 4,712,946, Cl. 405-170.000.
Greaves, Peter, to Dobson Park Industries plc. Typewriter carriage escapement mechanism having two sets of teeth. 4,712,934, Cl. 400-332.500.
Grebur, Dennis J.: *See*—
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Greer, John S.: *See*—
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Greiner, Peter; Pfluger, Hubert; and Widmann, Horst, to Adidas Sportschuhfabriken Adi Dassler Stiftung & Co. KG. Gripping element for a sports shoe. 4,712,318, Cl. 36-134.000.
Gretag Aktiengesellschaft: *See*—
Kunz, Rino E.; Junghaus, Jurgen R.; Knus, Jean A.; Murbach, Urs; and Tuor, Marcel F., 4,713,537, Cl. 250-227.000.
Grill, Hans; and Tappen, Gerhard. Racking device. 4,712,691, Cl. 211-49.100.
Grimm, Christel, executrix: *See*—
Arold, Klaus; Grimm, Hermann, deceased; and Koukal, Heinz, 4,712,608, Cl. 165-41.000.
Grimm, Hermann, deceased: *See*—
Arold, Klaus; Grimm, Hermann, deceased; and Koukal, Heinz, 4,712,608, Cl. 165-41.000.
Grinn, James M.: *See*—
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Groland, Hans: *See*—
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Grosjean, Michel. Single-phase motor with a magnetized rotor. 4,713,565, Cl. 310-49.00R.
Gross, Andrew: *See*—
Schultz, Thomas G.; Gross, Andrew; Pappas, Barbara; Shifrin, George D.; and Mack, Lois, 4,713,780, Cl. 364-514.000.
Gross, Peter L., to Gross, Thomas L., a part interest. Material handling rack with transportation means. 4,712,966, Cl. 414-458.000.
Gross, Thomas L.: *See*—
Gross, Peter L., 4,712,966, Cl. 414-458.000.
Grossi, Pierre-Jean: *See*—
Andre, Jean-Daniel; Grossi, Pierre-Jean; Heymes, Alain; and Manzaroli, Giovanni V., 4,713,485, Cl. 562-470.000.
Grossman, Mark W., to GTE Products Corporation. Method and apparatus for monitoring the flow of mercury in a system. 4,713,547, Cl. 250-373.000.
Groth, Hugh F.: *See*—
Duncan, L. Scot; Groth, Hugh F.; and Collins, John M., 4,712,740, Cl. 239-340.000.
Gruber, David: *See*—
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Grunberg, Pierre, to Valeo. Method of automatically operating a clutch release bearing according to the speeds of the shafts coupled by an associated clutch. 4,712,658, Cl. 192-0.033.
Grunert, Kurt A.; and Schlosser, Donald E., to Westinghouse Electric Corp. Circuit breaker with push-to-trip button and trip bar. 4,713,639, Cl. 335-172.000.
GTE Communication Systems Corporation: *See*—
Conforti, Joseph A., 4,713,793, Cl. 364-900.000.
Saluski, Robert A., 4,713,791, Cl. 364-900.000.
GTE Government Systems Corporation: *See*—
MacDonald, Donald C., 4,713,523, Cl. 219-385.000.
GTE Laboratories Incorporated: *See*—
Bulat, Emel S.; Ditchek, Brian M.; and Butler, Scott J., 4,713,358, Cl. 437-65.000.

Byszewski, Wojciech W.; Fallier, Charles N., Jr.; and Lester, James N., 4,713,587, Cl. 315-289.000.
GTE Products Corporation: *See*—
Brown, David R.; Frost, Charles E., Jr.; and White, Kenneth A., 4,713,104, Cl. 65-18.100.
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Grossman, Mark W., 4,713,547, Cl. 250-373.000.
Leo, Vincent B.; Cyll, Kenneth M.; and Ide, Mason G., 4,713,524, Cl. 219-307.000.
Melanson, Lionel J.; and Watson, Richard C., 4,713,529, Cl. 219-541.000.
Schoene, Carl M., 4,713,580, Cl. 313-624.000.
GTE Sprint Communications Corp.: *See*—
Chum, Stanley, 4,713,810, Cl. 371-4.000.
Gualtieri, Devlin M.; and Lai, Shui T., to Allied Corporation. Multilayer faceted luminescent screens. 4,713,577, Cl. 313-468.000.
Guangxi, Yue: *See*—
Xu-Yi, Zhang; Guangxi, Yue; and Qiayu, Zheng, 4,712,514, Cl. 122-4.00D.
Guilbault, Lawrence J.: *See*—
Hoover, M. Fred; and Guilbault, Lawrence J., 4,713,236, Cl. 424-70.000.
Guilford Mills, Inc.: *See*—
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Guleserian, Armen J.: *See*—
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Gulf Eastern Manufacturing Company: *See*—
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Gulton Industries, Inc.: *See*—
Doshi, Vikram N., 4,713,145, Cl. 156-667.000.
Gunderman, Roland E.: *See*—
Czerepinski, Ralph G.; and Gunderman, Roland E., 4,713,412, Cl. 524-833.000.
Gunn, John B., to International Business Machines Corporation. Apparatus for inspection of the walls of deep holes of minute diameter. 4,712,916, Cl. 356-241.000.
Gustavsson, Lennart, to Flakt AB. Method and apparatus for producing a continuous web. 4,712,277, Cl. 19-296.000.
Guttner, Eckhard, to ANT Nachrichtentechnik GmbH. Method for increasing resolution in a compatible television system. 4,713,688, Cl. 358-141.000.
Haba, Tsuneo: *See*—
Yoshiki, Naokazu; Saito, Yutaka; and Haba, Tsuneo, 4,712,407, Cl. 72-68.000.
Hackman, Arthur F. Photoelectric controller device including brushes. 4,713,539, Cl. 250-231.0SE.
Hadank, John M.; and Creger, Todd D., to Caterpillar Inc. Proportional valve control apparatus for fluid systems. 4,712,376, Cl. 60-427.000.
Haefliger, William W.: *See*—
Pangburn, William E., 4,712,552, Cl. 128-355.000.
Hafner, Gunther: *See*—
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Hagemann, Hermann: *See*—
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Hagiwara, Haruo; Tsukamoto, Hideo; and Tsubaki, Yasuhiro, to Mitsubishi Jukogyo Kabushiki Kaisha. Dry cleaning apparatus. 4,712,392, Cl. 68-18.00C.
Hagiwara, Kenji: *See*—
Ikura, Katsuyata; Hagiwara, Kenji; Nagasaki, Fumihiko; Yamada, Tomio; Takahashi, Hidemitsu; and Hatano, Renpei, 4,713,396, Cl. 514-594.000.
Haglund, Steve A.; Lohmann, Arthur M.; and Pickering-Johnson, Sharon A., to Honeywell Inc. Align at fire, safe and arm, and power supply module for a land mine. 4,712,478, Cl. 102-424.000.
Hahn, Granville J.: *See*—
Searl, Alonzo H.; Hahn, Granville J.; and Rutledge, Raleigh N., 4,713,271, Cl. 428-36.000.
Haimson, Jacob, to Haimson Research Corporation. Method and apparatus for accelerating a particle beam. 4,713,581, Cl. 315-5.410.
Haimson Research Corporation: *See*—
Haimson, Jacob, 4,713,581, Cl. 315-5.410.
Hajek, Manfred: *See*—
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Hakamata, Yoshimi: *See*—
Ohno, Yasunori; Kurosawa, Tomoe; Sato, Tadashi; Kurosawa, Yukio; and Hakamata, Yoshimi, 4,713,585, Cl. 315-111.810.
Hakamatsuka, Yasuharu; and Yokoyama, Nobuyuki, to Olympus Optical Co., Ltd. Artificial tooth root. 4,713,006, Cl. 433-201.100.
Hako Minuteman, Inc.: *See*—
Palmer, Gary E., 4,712,270, Cl. 15-345.000.
Hale, Arthur D. Radio-tape recorder for automotive use. 4,713,801, Cl. 369-7.000.
Hale Fire Pump Company: *See*—
Eberhardt, H. Alfred, 4,712,516, Cl. 123-1.00A.
Haley, Charles T.: *See*—
Hardage, Timothy W.; Haley, Charles T.; and Walker, William D., 4,712,356, Cl. 53-446.000.
Haley, William J., to Borg-Warner Corporation. Hydraulic control system for continuously variable transmission. 4,712,453, Cl. 74-866.000.
Hall, Gary W. Joggers fluid weighted exerciser jug. 4,712,794, Cl. 272-122.000.
Hall, Joe T.: *See*—
De Kelaita, Nergal R.; Hall, Joe T.; and Kletscher, Barrie D., 4,713,758, Cl. 364-200.000.
Hall, Marilyn: *See*—
Jenkins, Robert H., Jr.; Mitchell, Edward; Gaetani, Frank J.; Mahusky, John J.; and Hall, Marilyn, 4,713,087, Cl. 44-53.000.
Hall, Richard A.; and Rosenfeld, Jeffrey I., to Standard Oil Company (Indiana). Process for obtaining narrow molecular weight distribution in vinyl aromatic mass polymerization system. 4,713,421, Cl. 525-242.000.
Hall, Ronald H.: *See*—
Atwood, Mark T.; and Hall, Ronald H., 4,713,177, Cl. 210-697.000.
Hallett, Allan: *See*—
Szelke, Michael; Jones, David M.; and Hallett, Allan, 4,713,445, Cl. 530-330.000.
Hallford, Ben R.; and Varian, Karl R., to Rockwell International Corporation. Dual signal amplitude modifying and combining apparatus. 4,713,620, Cl. 328-150.000.
Hallford, Ben R.; and McKenzie, Robert W., to Rockwell International Corporation. Microwave plug-in signal amplifying module solderment apparatus. 4,713,730, Cl. 361-419.000.
Halliburton Company: *See*—
Handke, Wayne A.; and Priest, Mark A., 4,712,618, Cl. 166-308.000.
Stepp, Lee W.; and Giroux, Richard L., 4,712,619, Cl. 166-327.000.
Halssig, Andreas: *See*—
Lindstadt, Klaus; Halssig, Andreas; Maier, Dietmar; and Scholz, Stefan, 4,712,480, Cl. 102-427.000.
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Hamada, Nagaharu: *See*—
Nakamura, Kozoo; Kozima, Yasuyuki; Hamada, Nagaharu; and Sakata, Kunihiro, 4,713,699, Cl. 358-296.000.
Hamajima, Kaneo; Dohnomoto, Tadashi; Tanaka, Atsuo; and Kubo, Masahiro, to Toyota Jidosha Kabushiki Kaisha. Production of pistons having a cavity. 4,712,600, Cl. 164-97.000.
Hamano, Hideo; Sugita, Jun; and Watanabe, Takashi. Apparatus for converting interchangeable camera lens from manual into autofocus. 4,712,900, Cl. 354-400.000.
Hamel, Esther V. M.: *See*—
Kelly, L. Thomas; Hamel, Esther V. M.; and Bielka, Robert P., 4,713,054, Cl. 604-89.000.
Hammersley, Graham J.: *See*—
Greatorex, Cyril B.; Smith, Ian W. H.; and Hammersley, Graham J., 4,712,946, Cl. 405-170.000.
Hanak, Joseph J., to Energy Conversion Devices, Inc. Stowable large area solar power module. 4,713,492, Cl. 136-245.000.
Handke, Wayne A.; and Priest, Mark A., to Halliburton Company. Multiple reservoir transportation assembly for radioactive substances, and related method. 4,712,618, Cl. 166-308.000.
Hansen, Charles A., to Ford Motor Company. Adjusting mechanism for tractor linkage. 4,712,445, Cl. 74-491.000.
Hansen, Lee E.: *See*—
Schoendorfer, Donald W.; and Hansen, Lee E., 4,713,176, Cl. 210-645.000.
Hansen, Walter J.: *See*—
Franklin, Duane R.; Evans, Archibald D.; and Hansen, Walter J., 4,712,653, Cl. 187-18.000.
Hanssler, Gerd: *See*—
Salzburg, Herbert; Hajek, Manfred; Hagemann, Hermann; Kuhle, Engelbert; Fuhrer, Wolfgang; Hanssler, Gerd; Brandes, Wilhelm; and Reinecke, Paul, 4,713,389, Cl. 514-373.000.
Hansson, Curt, to Kraftelektronik AB. Electrostatic dust precipitator. 4,713,093, Cl. 55-139.000.
Hara, Hiroshi: *See*—
Aono, Toshiaki; and Hara, Hiroshi, 4,713,319, Cl. 430-567.000.
Hara, Osamu: *See*—
Kimura, Kiyoshi; and Hara, Osamu, 4,713,496, Cl. 178-18.000.
Harada, Osamu: *See*—
Anzai, Katsushi; Harada, Osamu; Suematsu, Toshio; and Takeda, Yuji, 4,712,522, Cl. 123-179.00L.
Haraguchi, Shosuke, to Canon Kabushiki Kaisha. Camera battery cover for a camera having a chamber for a built in battery. 4,712,898, Cl. 354-288.000.
Hardage, Timothy W.; Haley, Charles T.; and Walker, William D., to Food Machinery Sales, Inc. Tray loader. 4,712,356, Cl. 53-446.000.
Harder, Hans E.; and Kramer, Hermann, to Howmedica International, Inc. Bone nail and instruments for the treatment of fractures. 4,712,541, Cl. 128-92.0YY.
Hardglass Industry Co., Ltd.: *See*—
Fujiwara, Kenichi, 4,712,331, Cl. 49-488.000.
Hardie, Laurie S.; and Coleman, Leonard J. Vibratory sauna. 4,712,538, Cl. 128-24.100.
Harding, Thomas W.: *See*—
Kim, Yong W.; and Harding, Thomas W., 4,713,548, Cl. 250-423.00R.
Hargitay, Bartholomew: *See*—
Siegel, Richard C.; Marx, Christina S.; Hargitay, Bartholomew; and Wotherspoon, Neil, 4,713,350, Cl. 436-533.000.

Haring , Ulrich: *See*—
Kristen, Ulrich; Haring , Ulrich; Fischer, Francis; and Cron, Alain, 4,713,186, Cl. 252-30.000.
Harrington, Richard H.; and Krapf, Charles W., to Measuretek, Inc. Calibration of weight scale utilizing a capacitative load cell. 4,712,627, Cl. 177-50.000.
Harris, Alva F.: *See*—
Lavengood, Richard E.; Padwa, Allen R.; and Harris, Alva F., 4,713,415, Cl. 525-66.000.
Harris, Charles F., Jr.; and Coleman, James C., to Ford Motor Company. Modular window assembly clip. 4,712,341, Cl. 52-208.000.
Harris Corporation: *See*—
Beasom, James D., 4,713,681, Cl. 357-52.000.
Roberts, Bruce E.; Black, Jimmy C.; and Matlock, Dyer A., 4,713,260, Cl. 437-238.000.
Roskind, James A., 4,713,786, Cl. 364-715.000.
Harris, Donald L., to Cordis Leads, Inc. A pacer including a multiple connector assembly with removable wedge and method of use. 4,712,557, Cl. 128-419.00P.
Harris, James E.; and Robeson, Lloyd M., to Amoco Corporation. Blends of a biphenyl containing poly(aryl ether sulfone) and a poly(aryl ether ketone). 4,713,426, Cl. 525-471.000.
Harris, James E.; Berger, Abe; Chopdekar, Vilas M.; Matzner, Markus; and Spanswick, James, to Amoco Corporation. Amide and/or imide containing polymers and monomers for the preparation thereof. 4,713,438, Cl. 528-337.000.
Harris, Ronald N.: *See*—
Crout, Charles J.; Frame, Charles W.; and Harris, Ronald N., 4,712,404, Cl. 72-8.000.
Crout, Charles J.; Frame, Charles W.; and Harris, Ronald N., 4,712,405, Cl. 72-19.000.
Crout, Charles J.; Frame, Charles W.; and Harris, Ronald N., 4,712,415, Cl. 72-8.000.
Harris, Terence E.: *See*—
Hewison, George D.; and Harris, Terence E., 4,712,802, Cl. 277-212.00C.
Harrison, Daniel J., to Eastman Kodak Company. Adhesives for laminating thermal print elements. 4,713,365, Cl. 503-227.000.
Harrison, Eddie, Jr. Article carrier. 4,712,804, Cl. 280-47.13R.
Harsanyi, Kalman: *See*—
Ezer, Elemer; Harsanyi, Kalman; Petho, Hajnalka V.; Matuz, Judit; Szporny, Laszlo; Cholnoky, Eszter; Kuthi, Csaba; Trischler, Ferenc; Hegedus, Bela; Kapolnas, Marta; and Kallay, Anna, 4,713,388, Cl. 514-346.000.
Hartmann, Robert F.; Chan, Yiu-Fai; Frankovich, Robert J.; Ou, Jung-Hsing; So, Hock C.; and Wong, Sau-Ching, to Altera Corporation. Programmable macrocell using eprom or eeprom transistors for architecture control in programmable logic circuits. 4,713,792, Cl. 364-900.000.
Haruguchi, Kenji; Kohguchi, Takuma; and Sekiya, Osamu, to Sumitomo Heavy Industries, Ltd. Method of mounting blister on ship's hull in dry dock. 4,712,499, Cl. 114-77.00R.
Haruna, Kazuo; and Shiozawa, Iwamitsu, to Seitetsu Kagaku Co., Ltd. Adsorption apparatus. 4,713,100, Cl. 55-387.000.
Harwick, Milton C.; and Spector, George. Weight maximizer. 4,712,793, Cl. 272-118.000.
Harwood, Jon W.: *See*—
Peele, Camille; Harwood, Jon W.; and Resuggan, Peter L., 4,712,295, Cl. 29-700.000.
Hasan, Riaz, to Illinois Tool Works Inc. Washer with resilient head cripping means. 4,712,959, Cl. 411-533.000.
Hasegawa, Akinori: *See*—
Morishita, Akira; Okamoto, Kyoichi; Nakagawa, Taiichi; Morikane, Hiroyuki; Hasegawa, Akinori; Arima, Takemi; and Kounou, Tadami, 4,712,451, Cl. 74-801.000.
Hasegawa, Hiroshi; and Inoue, Mitsuhiro, to Hitachi Chemical Co., Ltd. Ceramic coated laminate and process for producing the same. 4,713,284, Cl. 428-246.000.
Hasegawa, Kenji; Sato, Tetsuo; and Iwanami, Teruo, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. Method for production of polyester structures with improved gas barrier property. 4,713,266, Cl. 427-412.500.
Hasegawa, Yonosuke, to Pioneer Electronic Corporation. Data communication system. 4,713,840, Cl. 455-2.000.
Hasuo, Shinya; and Fujimaki, Norio, to Fujitsu Limited. Josephson-junction logic circuit. 4,713,562, Cl. 307-462.000.
Hatakeyama, Takuya; and Ohga, Shinji, to Uro Denshi Kogyo Kabushiki Kaisha. Connector for television distribution equipment. 4,713,024, Cl. 439-555.000.
Hatamura, Yotaro. Multi-axis load sensor. 4,712,431, Cl. 73-862.040.
Hatano, Renpei: *See*—
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Woike, Theo; Krasser, Wolfgang; and Haussuhl, Siegfried, 4,713,795, Cl. 365-119.000.
Hawks, Robert A. Rectal speculum with obturator. 4,712,536, Cl. 128-3.000.
Hayakawa, Toshiaki: *See*—
Sugimoto, Tadao; and Hayakawa, Toshiaki, 4,713,318, Cl. 430-567.000.
Hayase, Syozo: *See*—
Torii, Sigeru; Tanaka, Hideo; Sasaoka, Michio; Uto, Seiryu; and Hayase, Syozo, 4,713,452, Cl. 540-358.000.
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Hayatsu, Kazuo: *See*—
Sugimoto, Hircaki; Hayatsu, Kazuo; and Fujiwara, Masahiro, 4,713,435, Cl. 528-179.000.
Hayes, Michael L.; Mahr, Paul S.; and Tippie, John W., to Kinetic Systems Corporation. System and method for preventing tool breakage. 4,713,770, Cl. 364-474.000.
Hayes, Robert A.; and Conard, Wendell R., to Firestone Tire & Rubber Company, The. Vulcanizable polymeric compositions containing a zinc dimethacrylate adjuvant and method for preparing the adjuvant. 4,713,409, Cl. 524-518.000.
Haygood, David K.: *See*—
Noel, Raymond; Robinson, William M.; Cherian, Gabe; Clifford, Thomas H.; Carlomagno, William D.; Deasy, William M.; Grassauer, Willie K.; Haygood, David K.; Sherlock, H. Paul; and White, Harry E., 4,712,721, Cl. 228-56.300.
Hazan, Jean-Pierre; and Steers, Michel, to U.S. Philips Corporation. Microwave oven having control means which reduce the risk of no-load operation. 4,713,514, Cl. 219-10.55B.
Hazelett Strip-Casting Corporation: *See*—
Kaiser, Timothy D.; and Ackel, Gary P., 4,712,602, Cl. 164-453.000.
Healey, Fritz W.: *See*—
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Healthdyne, Inc.: *See*—
Russell, Donald J.; and Sanders, Michael A., 4,713,558, Cl. 307-264.000.
Hecking, Robert J., to Champion International Corporation. Air freshener container having resealable openings. 4,712,737, Cl. 239-58.000.
Hedaya, Eddie: *See*—
Fox, John P.; Hedaya, Eddie; and Lippman, Violet, 4,713,324, Cl. 435-4.000.
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Hehl, Karl. Hydraulic control system for injection unit of injection molding machine. 4,712,991, Cl. 425-145.000.
Heidelberger Druckmaschinen AG: *See*—
Jeschke, Willi, 4,712,476, Cl. 101-415.100.
Rodi, Anton; and Blaser, Peter, 4,713,593, Cl. 318-572.000.
Heinonen, Aaro. Device for cleaning up floors. 4,712,268, Cl. 15-231.000.
Heinrich, Hansjorg; and Kraft, Josef, to Diehl GmbH & Co. Additive sealing sleeve for a propellent charge for large-calibered ammunition fired from barreled weapons. 4,712,481, Cl. 102-435.000.
Heitzmann, Hal: *See*—
Hsu, Li-chien; and Heitzmann, Hal, 4,712,865, Cl. 350-96.290.
Heiwado Boueki Kabushiki Kaisha: *See*—
Hiraishi, Mamoru, 4,712,279, Cl. 24-241.00R.
Heizmann, Frieder, to Robert Bosch GmbH. Tracking mount for a contactless recording and/or reproducing head. 4,713,707, Cl. 360-106.000.
Heller, Donald F., to Allied Corporation. Noble-metal overcoated, front-surface silver reflectors. 4,713,824, Cl. 372-99.000.
Heller, Donald F.: *See*—
Morris, Robert C.; Long, Margaret N.; Chin, Timothy C.; and Heller, Donald F., 4,713,820, Cl. 372-41.000.
Heller, Jorge; and Penhale, Donald W. H., to Sandoz Pharmaceuticals Corp. Polyacetal hydrogels formed from divinyl ethers and polyols. 4,713,441, Cl. 528-392.000.
Helling, Wilhelm. Apparatus for the application of a primer to a plastic profile or the like. 4,712,507, Cl. 118-208.000.
Hemascience Laboratories, Inc.: *See*—
Schoendorfer, Donald W.; and Hansen, Lee E., 4,713,176, Cl. 210-645.000.
Hemmeter, George T. Sponge-block safety razor holder. 4,712,300, Cl. 30-41.000.
Henaff, Bernard, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Method and device for selecting one station from a set of stations dialoging with a main station. 4,713,805, Cl. 370-85.000.
Henderson, Ross, to Powercube Corporation. Extended range regulated power supply. 4,713,554, Cl. 307-64.000.
Heng, Jean-Paul; Jusseau, Marcel; and Humbert-Labeaumaz, Alain, to Cgee Alsthom. Junction block for optical fibers. 4,712,863, Cl. 350-96.210.
Hennes, Jacques: *See*—
Augendre, Claude; Rapidel, Jean-Loup; and Hennes, Jacques, 4,712,425, Cl. 73-460.000.
Henson, Edward: *See*—
Gallop, Paul M.; Henson, Edward; and Fluckiger, Rudolf, 4,713,346, Cl. 436-86.000.
Henton, David E., to Dow Chemical Company, The. ABS compositions having trimodal rubber particle distributions. 4,713,420, Cl. 525-236.000.

Hepler, Edward L.: *See*—
Brahm, David J.; Grinn, James M.; Hepler, Edward L.; and Schan, Edward P., Jr., 4,713,834, Cl. 379-28.000.
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Herndon, William H., to Fairchild Semiconductor Corporation. Switched impedance emitter coupled logic gate. 4,713,560, Cl. 307-455.000.
Herr, Leroy E.; Shea, Allan K.; and Kunkle, Timothy E., to White Consolidated Industries, Inc. Quarter turn valve. 4,712,768, Cl. 251-305.000.
Herring, James M., Jr., to Budd Company, The. Elastomeric member having flexible woven material bonded thereto in a railway truck primary suspension system. 4,712,488, Cl. 105-224.100.
Herrmann, Johann, to Sachsenwerk AG. Partitioned switching panel with insertable switching carriage and adjustable shutter mechanism. 4,713,501, Cl. 200-50.0AA.
Herron, Michael M., to Schlumberger Technology Corp. Quantitative determination by elemental logging of subsurface formation properties. 4,712,424, Cl. 73-152.000.
Herwig, Jens; Norenberg, Hagen; Bergmann, Friedhelm; Stiller, Manfred; Schlemmermeyer, Horst; Schmidt, Wilfried; Straube, Hilmar; and Wolter, Helmut, to EC Erdolchemie GmbH. Device for emission-free sampling of volatile liquids. 4,712,434, Cl. 73-864.630.
Herz, Arthur H.: *See*—
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Kramer, Josef; Irmscher, Klaus; Prucher, Helmut; and Hesch, Rolf-Dieter, 4,713,465, Cl. 549-403.000.
Hesse, Hans, to Krauss-Maffei A.G. Chain tensioning device. 4,712,469, Cl. 91-422.000.
Hewison, George D.; and Harris, Terence E., to Illinois Tool Works Inc. Sealing washers for headed fasteners. 4,712,802, Cl. 277-212.00C.
Hewlett-Packard Company: *See*—
Blackham, Ray, 4,713,782, Cl. 364-553.000.
Worley, William S., Jr.; Bryg, William R.; and Baum, Allen, 4,713,755, Cl. 364-200.000.
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Hibino, Yoshitaka; and Kogure, Hiroshi, to Honda Giken Kogyo Kabushiki Kaisha. Method for directing an up-shift operation for a vehicle with a manual transmission. 4,712,452, Cl. 74-866.000.
Higashi, Kenji; Ohnishi, Tadakazu; and Tsukuda, Ichizo, to Showa Aluminum Kabushiki Kaisha. Aluminum alloys having high strength and resistance to stress and corrosion. 4,713,216, Cl. 420-532.000.
Higuchi, Seizun; Oga, Tomonari; Ikeda, Masao; and Nakano, Hirohumi, to Nippon Steel Corporation. Sn-based multilayer coated steel strip having improved corrosion resistance, weldability and lacquerability. 4,713,301, Cl. 428-628.000.
Hill, Brian S.: *See*—
Tonyes, Henry J.; Keehn, William T.; German, Harold W.; and Hill, Brian S., 4,713,250, Cl. 426-2.000.
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Hills, Karen F.; and Jones, Howell A., to Pitney Bowes Inc. Method and apparatus for locating and displaying historical information within an electronic postage meter. 4,713,769, Cl. 364-464.000.
Hiltman, Paul D. Flashlight for use in vehicles. 4,713,735, Cl. 362-183.000.
Hiltz, Ralph H.; Greer, John S.; and Friel, Joseph V., to Mine Safety Appliances Company. Fire-fighting foam. 4,713,182, Cl. 252-3.000.
Hino, Youzi, to Fujitsu Limited. Bias voltage compensated integrated circuit digital-to-analog converter. 4,713,649, Cl. 340-347.0DA.
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Hiraishi, Mamoru, to Heiwado Boueki Kabushiki Kaisha. Clasp for personal ornaments. 4,712,279, Cl. 24-241.00R.
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Hirama, Shinichi; Nishiyama, Toshio; Ohta, Youichi; Uzuka, Makoto; Tomita, Kenichi; Nakajima, Keisuke; and Furuse, Kazumaro, to Eisai Co., Ltd. Composition for reducing natural hair fall-out. 4,713,397, Cl. 514-690.000.
Hirata, Chiaki: *See*—
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Hirata, Hidetoshi, to Kabushiki Kaisha Toshiba. Cooking apparatus with timer. 4,713,528, Cl. 219-492.000.
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Hirschel, Ernst H., to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung. Tail end structure for an aircraft fuselage. 4,712,751, Cl. 244-119.000.
Hiruta, Yoichi, to Kabushiki Kaisha Toshiba. Manufacturing MOS semiconductor device with planarized conductive layer. 4,713,356, Cl. 437-41.000.
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Ishizawa, Isamu; and Tamaki, Sigeo, 4,712,531, Cl. 123-556.000.
Kokaku, Yuuichi; Kitoh, Makoto; and Honda, Yoshinori, 4,713,288, Cl. 428-336.000.
Kosaka, Michitaka; Kawano, Katsumi; and Miyamoto, Shoji, 4,713,768, Cl. 364-460.000.
Kuwahara, Kazuyoshi; Fukushima, Isao; Miura, Kuniaki; and Kano, Kenji, 4,713,700, Cl. 358-315.000.
Misumi, Akira; Hirai, Ryoji; and Watanabe, Rikizo, 4,713,576, Cl. 313-402.000.
Nakamura, Hiro; Ohkawa, Shuji; Ohtsuka, Yasuo; Tachikawa, Hajime; and Shinozaki, Toshiya, 4,712,970, Cl. 414-730.000.
Nakamura, Kozoo; Kozima, Yasuyuki; Hamada, Nagaharu; and Sakata, Kunihiro, 4,713,699, Cl. 358-296.000.
Ogiue, Katsumi; Suzuki, Yukio; Masuda, Ikuro; Odaka, Masanori; and Uchida, Hideaki, 4,713,796, Cl. 365-189.000.
Ohno, Yasunori; Kurosawa, Tomoe; Sato, Tadashi; Kurosawa, Yukio; and Hakamata, Yoshimi, 4,713,585, Cl. 315-111.810.
Oikawa, Shoji; Yamagishi, Hiroshi; Saito, Shigeru; Fujita, Tsuyoshi; and Watanabe, Takayoshi, 4,713,494, Cl. 174-68.500.
Sunano, Naomasa; Asahi, Naotatsu; and Yoshida, Toshio, 4,713,646, Cl. 338-34.000.
Takahashi, Tadashi; Miyashita, Kunio; and Kawamata, Syooichi, 4,713,613, Cl. 324-208.000.
Takayama, Shigehiko; Suzuki, Hitomi; Maruyama, Masanori; Fukushima, Masakazu; and Kurashige, Mitsuhiro, 4,713,588, Cl. 315-382.000.
Terasawa, Yoshio; and Oikawa, Saburo, 4,713,679, Cl. 357-38.000.
Umeda, Takao; Ooishi, Kazuya; Igawa, Tatsuo; and Hori, Yasuro, 4,712,876, Cl. 350-350.00S.
Yamamoto, Akio; and Shinkawa, Keiro, 4,713,556, Cl. 307-219.100.
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Misumi, Akira; Hirai, Ryoji; and Watanabe, Rikizo, 4,713,576, Cl. 313-402.000.
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Ho, Tan T., to Lever Brothers Company. Stable, free-flowing particulate adjuncts for use in detergent compositions. 4,713,193, Cl. 252-91.000.
Hochstein, Peter; and Imai, Nobuyuki, to Aisin Seiki Kabushiki Kaisha. Torque sensor for automotive power steering systems. 4,712,433, Cl. 73-862.360.
Hochstein, Peter A.; and Imai, Nobuyuki, to Al Sin Seiki Kabushiki Kaisha. Torque sensor. 4,712,432, Cl. 73-862.360.
Hochstein, Peter A. Headlamp cleaning system. 4,713,583, Cl. 315-82.000.
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Wachholz, Winfried; and Weicht, Ulricht, 4,713,211, Cl. 376-238.000.
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Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 4,712,904, Cl. 354-475.000.
Hodgens, Henry M., II; and Cellich, William A., to United Technologies Corporation. Method for cleaning a gas turbine engine. 4,713,120, Cl. 134-3.000.
Hoechst Aktiengesellschaft: *See*—
Aretz, Werner; Berscheid, Hans G.; Huber, Gerhard; Fehlhaber, Hans-Wolfram; Kraemer, Hans P.; Sedlacek, Hans-Harald; Ganguli, Bimal N.; Sood, Ratan S.; Gandhi, Julia; and Reddy, Gauknapalli C., 4,713,371, Cl. 514-34.000.
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Hoff, Don G.: *See*—
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Hofmann, Franz; Trapp, Hans G.; Rietzscher, Rolf; Otto, Jurgen; Kaettlitz, Wolfgang; and Trinki, Gerd, to Georg Fischer Aktiengesellschaft. Ceramic filter and method for using same. 4,713,180, Cl. 210-773.000.
Hofmann, Rainer, to Daimler-Benz Aktiengesellschaft. Regulating apparatus which influences a mixture-forming installation of an internal-combustion engine of a motor vehicle. 4,713,763, Cl. 364-424.100.
Hogendobler, Richard S.: *See*—
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Hok, Bertil, to Radisensor AB. Device for recording physiological pressures. 4,712,566, Cl. 128-748.000.
Hokanson, Gerard C.: *See*—
Schaumberg, John P.; Hokanson, Gerard C.; French, James C.; Tunac, Josefino B.; and Underhill, Marjorie A., 4,713,372, Cl. 514-45.000.
Hokkai Can Co., Ltd.: *See*—
Nakata, Akira; Matsumoto, Shiroh; Tozima, Hitoshi; and Minato, Masahiko, 4,712,706, Cl. 220-276.000.
Holland, John M.: *See*—
Porter, David R.; Bowen, James H.; and Holland, John M., 4,713,841, Cl. 455-608.000.
Holliday, Richard J.: *See*—
Lair, John E.; Luckenbill, Lawrence F.; and Holliday, Richard J., 4,712,575, Cl. 137-218.000.
Holliday, William: *See*—
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Holmwood, Graham: *See*—
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Holoubek, Andrew J.: *See*—
McCann, Gerald P.; Holoubek, Andrew J.; and Verley, Donald, 4,712,591, Cl. 141-88.000.
Holthusen, Bernd, to Scangraphic Dr. Boger GmbH. Photosetting apparatus. 4,712,896, Cl. 354-5.000.
Honda Giken Kogyo Kabushiki Kaisha: *See*—
Anno, Nobuo; and Arai, Takeo, 4,712,517, Cl. 123-41.740.
Hibino, Yoshitaka; and Kogure, Hiroshi, 4,712,452, Cl. 74-866.000.
Kawaguchi, Takeshi; and Kawano, Akio, 4,712,638, Cl. 180-219.000.
Midorikawa, Masashi; and Inoh, Isamu, 4,712,891, Cl. 350-604.000.
Mogi, Tomonori; and Kashio, Yoshiaki, 4,712,637, Cl. 180-219.000.
Sugama, Takayuki; Tabata, Hiroshi; and Honda, Tadanori, 4,712,759, Cl. 248-429.000.
Suzuki, Takahisa; Kuwahara, Shinichi; and Kawashima, Yoshinori, 4,712,633, Cl. 180-149.000.
Honda, Masahiro; and Maeda, Hironari, to Ube Industries, Ltd. Apparatus for stacking shaped materials on a pallet. 4,712,961, Cl. 414-42.000.
Honda, Tadanori: *See*—
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Honda, Yoshinori: *See*—
Kokaku, Yuuichi; Kitoh, Makoto; and Honda, Yoshinori, 4,713,288, Cl. 428-336.000.
Honeywell Inc.: *See*—
Bergstrom, James W.; and Podgorski, Theodore J., 4,712,917, Cl. 356-350.000.
Boebert, William E.; and Kain, Richard Y., 4,713,753, Cl. 364-200.000.
Davidson, Dale D.; and Endrud, Douglas G., 4,713,757, Cl. 364-200.000.
Erie, David G.; Roberts, Jon A.; and Lee, Eddie C., 4,713,682, Cl. 357-54.000.
Hagland, Steve A.; Lohmann, Arthur M.; and Pickering-Johnson, Sharon A., 4,712,478, Cl. 102-424.000.
Lee, James C., 4,712,857, Cl. 350-96.140.
Vu, Tho T.; and Lee, Kang W., 4,713,559, Cl. 307-446.000.
Honjo, Takeshi: *See*—
Nakayama, Tomobumi; Mori, Toshihiko; Hirose, Masayuki; Ohbuchi, Toru; Miyata, Masanori; Nakamura, Shinichi; and Honjo, Takeshi, 4,712,908, Cl. 355-14.0SH.
Honkanen, George P., to Acufex Microsurgical, Inc. Surgical instrument. 4,712,545, Cl. 128-305.000.
Hood, Donald W.; Johnson, John A.; and Smartt, Herschel B., to EG&G, Inc. Concurrent ultrasonic weld evaluation system. 4,712,722, Cl. 228-104.000.
Hood, Larry L.: *See*—
Steppe, Dennis L.; Hood, Larry L.; and Boggs, Gary D., 4,713,051, Cl. 604-30.000.
Hoover, Gary W.; Empson, Geuane; and Ashley, Bruce W. Noisemaking fishing lure. 4,712,326, Cl. 43-42.310.
Hoover, M. Fred; and Guilbault, Lawrence J., to Morton Thiokol, Inc. Polymeric amine conditioning additives for hair care products. 4,713,236, Cl. 424-70.000.
Hoover, Thomas C.: *See*—
Regnier, Kent E.; Hoover, Thomas C.; and Walse, Alan S., 4,713,013, Cl. 439-62.000.
Hooykaas, Carel W., to Pelt & Hooykaas B.V. Method of processing an iron-containing dust obtained in the preparation of iron or steel. 4,713,223, Cl. 423-140.000.
Hopfensperger, Reinhold; and Taschner, Klaus, to Standard Elektrik Lorenz AG. Tangential blower. 4,712,976, Cl. 415-54.000.
Hopkins, Daniel N.: *See*—
Ehlers, D. M.; and Hopkins, Daniel N., 4,712,616, Cl. 166-266.000.
Horan, William J.; and Schweid, Jeffrey M., to General Foods Corporation. Emulsification system for creamy cheese food products. 4,713,255, Cl. 426-589.000.
Horbelt, Michael: *See*—
Arnold, Herbert; Horbelt, Michael; and Jundt, Werner, 4,713,812, Cl. 371-10.000.
Hori, Kozo: *See*—
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Hori, Yasuro: *See*—
Umeda, Takao; Ooishi, Kazuya; Igawa, Tatsuo; and Hori, Yasuro, 4,712,876, Cl. 350-350.00S.
Horie, Shinji, to Mitsubishi Petrochemical Company Limited. Colored resin composition. 4,713,310, Cl. 430-109.000.
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Horihata, Katsushi; and Kawamori, Yoshizo, to Mita Industrial Co., Ltd. Laser beam printer. 4,713,672, Cl. 346-108.000.
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Horiyama, Osamu: *See*—
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Horn, Spencer C.; and Horn, Virginia. Apparatus for improved aeration of liquids. 4,713,172, Cl. 210-150.000.
Horn, Virginia: *See*—
Horn, Spencer C.; and Horn, Virginia, 4,713,172, Cl. 210-150.000.
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Horst, William E.: *See*—
Smit, Francis J.; Horst, William E.; and Bhasin, Anirudh K., 4,713,086, Cl. 44-51.000.
Horvath, Barbara L.: *See*—
Horvath, Ronald F.; and Horvath, Barbara L., 4,712,709, Cl. 220-334.000.
Horvath, Ronald F.; and Horvath, Barbara L. Fuel-intake device for vehicle tank. 4,712,709, Cl. 220-334.000.
Hosch, Michael A.: *See*—
Dorner, Wolfgang C.; Hosch, Michael A.; and Wedell, Mark C., 4,712,355, Cl. 53-443.000.
Hosel, Fritz; Marx, Hans-Jurgen; and Temburg, Josef, to Trutzschler GmbH & Co. KG. Method for driving a bale opener. 4,712,275, Cl. 19-80.00R.
Hoshino, Kazuya; and Matsuura, Hiroyuki, to Yokogawa Electric Corporation; and Yokogawa Medical Systems, Limited. Method of correcting the phase and shading in a nuclear magnetic resonance tomographic device. 4,713,614, Cl. 324-307.000.
Hoshino, Ryoichi: *See*—
Okamoto, Masayoshi; Suzuki, Katsuhisa; Hoshino, Ryoichi; and Sasaki, Hironaka, 4,712,612, Cl. 165-146.000.
Hoshino, Shigeo. Method and apparatus for electroplating objects. 4,713,149, Cl. 204-23.000.
Hosomizu, Hiroshi; Tsuji, Kenji; and Kamiya, Makoto, to Minolta Camera Kabushiki Kaisha. Device for indicating an object distance for flash photography. 4,712,902, Cl. 354-416.000.
Hovda, Keith D.: *See*—
Campbell, Kent D.; Dietsche, Laura J.; Crampton, Lee B.; Hovda, Keith D.; Tyson, George K.; and Wilson, Charles A., 4,713,231, Cl. 423-356.000.
Hovel, William G., III. Dental floss packet and method for its manufacture. 4,712,572, Cl. 132-89.000.
Howard, John; and Stirling, Marie, to Canadian Patents and Development Ltd. Sacrificial agents for enhanced oil recovery. 4,713,185, Cl. 252-8.554.
Howard, P. Guy, to Spectra-Physics, Inc. Rapidly starting low power scan mechanism. 4,712,853, Cl. 350-6.500.
Howard, Thomas R. Satellite retrieval apparatus. 4,712,753, Cl. 244-161.000.
Howland, Leland L.; and Seshadri, Jayaram, to Thermo King Corporation. Compartmentalized transport refrigeration system. 4,712,383, Cl. 62-200.000.
Howmedica International, Inc.: *See*—
Harder, Hans E.; and Kramer, Hermann, 4,712,541, Cl. 128-92.0YY.
Hsu, Chung: *See*—
Fang, Robert; Wang, Jerry; Liang, Victor; Farb, Joseph; and Hsu, Chung, 4,713,329, Cl. 437-29.000.
Hsu, Li-chien; and Heitzmann, Hal, to Baxter Travenol Laboratories. Dye containing silicon polymer composition. 4,712,865, Cl. 350-96.290.
Huang, Min-Siu: *See*—
Damouny, Nabil G.; Huang, Min-Siu; Wilnai, Dan; and Mor, Yeshayahu, 4,713,750, Cl. 364-200.000.

Huber, Gerhard: *See*—
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Huck Manufacturing Company: *See*—
Lofton, Hugh P., 4,712,333, Cl. 51-164.500.

Hucul, Dennis A., to Dow Chemical Company, The. High surface area supported noble metal catalysts and process for their preparation. 4,713,363, Cl. 502-262.000.

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Huff, John: *See*—
Zurilla, Ronald W.; and Huff, John, 4,713,121, Cl. 428-472.300.

Hughes Aircraft Company: *See*—
Conroy-Wass, Theodore R., 4,713,014, Cl. 439-67.000.
Lee, George M., 4,712,294, Cl. 29-600.000.
Manoly, Arthur E., 4,712,293, Cl. 29-600.000.
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Hughes Tool Company: *See*—
Wightman, William D.; and Strahan, Wilson L., 4,712,621, Cl. 166-382.000.

Hull, Alan; and Yates, Michael J. Lift-tab container opener. 4,712,454, Cl. 81-3.270.

Humbert-Labeaumaz, Alain: *See*—
Heng, Jean-Paul; Jusseau, Marcel; and Humbert-Labeaumaz, Alain, 4,712,863, Cl. 350-96.210.

Hummel, Peter: *See*—
Kemmerer, Klemens; and Hummel, Peter, 4,712,475, Cl. 101-348.000.

Hung, Paul L. K.; Radigan, Richard J.; and Rosen, David S., to M&T Chemicals Inc. Printed circuit boards having improved adhesion between solder mask and metal. 4,713,298, Cl. 428-461.000.

Hunt Leuchars and Hepburn Limited: *See*—
Thom, Michael J., 4,712,947, Cl. 405-288.000.

Hunter, Brook L.; Rizzie, Joseph W.; and Ward, Marvin L., to Technology for Energy Corporation. Electrical connector. 4,712,847, Cl. 439-155.000.

Hunter, Clifford R.: *See*—
Wenham, Bruce T.; Cook, Raymond; and Hunter, Clifford R., 4,712,339, Cl. 52-173.0PS.

Huppertsberg, Frank, to Gebr. Wahlefeld GmbH & Co. KG. Suspension harness. 4,712,513, Cl. 119-96.000.

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van Elten, Gerrit J.; Hurkmans, Antonius; and de Vries, Hugo V., 4,712,964, Cl. 414-281.000.

Hurt, Fred S.: *See*—
Bremer, James C.; Hurt, Fred S.; Romanski, John G.; Kroupa, Richard F.; and Kraus, Ronald G., 4,713,533, Cl. 250-203.00R.

Hurten, Oskar; and Vogt, Hans, to Ford Motor Company. Side member support. 4,712,829, Cl. 296-203.000.

Hutson, John, to Ampex Corporation. Programmable divider up/down counter with anti-aliasing feature and asynchronous read/write. 4,713,832, Cl. 377-45.000.

Huttner, James; and Levine, Marc M., to Medical College of Ohio. Mechanical assist device for inserting catheters. 4,713,057, Cl. 604-164.000.

Huynh, Anh N.; and Ziogas, Phoivos D., to National Distillers and Chemical Corporation. Ozonator power supply. 4,713,220, Cl. 422-186.160.

HV Hofmann and Volkel: *See*—
Voelkel, Helmut, 4,713,724, Cl. 361-231.000.

Hy-Con Products, Inc.: *See*—
Young, William I., 4,712,674, Cl. 206-328.000.

Hydril Company: *See*—
Reeves, Doyle E., 4,712,815, Cl. 285-334.000.

Hyodo, Akihiko: *See*—
Inagaki, Mitukane; Ohta, Masaki; Hyodo, Akihiko; Takenaka, Kenji; Mitibata, Takashi; Suzuki, Shinichi; and Kayukawa, Hiroaki, 4,712,982, Cl. 417-222.000.

Iannicelli, Joseph, to Aquafine Corporation. Method for removing organic reduced sulfur compounds. 4,713,225, Cl. 423-230.000.

Ichihara, Kenji: *See*—
Ohno, Sachio; Ebihara, Yuko; Mizukoshi, Kiyoshi; Ichihara, Kenji; Ban, Takao; and Nagasaka, Mitsuaki, 4,713,457, Cl. 546-67.000.

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Ide, Mason G.: *See*—
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Idemitsu Petrochemical Co., Ltd.: *See*—
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IDN Inventions and Development of Novelties AG: *See*—
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Idvorian, Nick; and Renshaw, Robert H., to Foster Wheeler Energy Corporation. Tandem curved arm steam-water separator. 4,713,098, Cl. 55-345.000.

Igarashi, Osamu, to Hitachi, Ltd. Vehicle-mounted electronic display gauge board with serial data transfer. 4,713,762, Cl. 364-424.000.

Igarashi, Yoshiaki: *See*—
Gotou, Makoto; Mitani, Hiroshi; and Igarashi, Yoshiaki, 4,713,697, Cl. 358-222.000.

Igawa, Tatsuo: *See*—
Umeda, Takao; Ooishi, Kazuya; Igawa, Tatsuo; and Hori, Yasuro, 4,712,876, Cl. 350-350.00S.

Ihnat, Dale E.: *See*—
Gilby, Anthony C.; and Ihnat, Dale E., 4,713,540, Cl. 250-231.00R.

Iida, Sachihiro, to Kawasaki Steel Corporation. Method of cooling steel strip in continuous heat treating line. 4,713,125, Cl. 148-128.000.

Ikai, Tadayoshi; and Kamo, Takashi, to Toyota Jidosha Kabushiki Kaisha. Air/fuel ratio detector. 4,712,419, Cl. 73-116.000.

Ikeda, Masao: *See*—
Higuchi, Seizun; Oga, Tomonari; Ikeda, Masao; and Nakano, Hirohumi, 4,713,301, Cl. 428-628.000.

Ikezaki, Yasuo; Matsuoka, Tadashi; and Mitani, Kazuyuki, to Toshiba Tungaloy Co., Inc.; Science & Creative Co., Ltd.; and Toyomitsu Kogyo, Co., Ltd. Anti-clogging device for grinding wheel. 4,712,334, Cl. 51-262.00A.

Ikezue, Tatsuya: *See*—
Yoshizawa, Shuji; Mitani, Wataru; Yamamoto, Mariko; Sanjoh, Akira; and Ikezue, Tatsuya, 4,713,308, Cl. 430-65.000.

Ikuma, Sadao, to Mitsubishi Monsanto Chemical Company. Method for production of copolymer of vinyl cyanide compound and aromatic vinyl compound. 4,713,429, Cl. 526-87.000.

Ikura, Katsuyata; Hagiwara, Kenji; Nagasaki, Fumihiko; Yamada, Tomio; Takahashi, Hidemitsu; and Hatano, Renpei, to Nippon Soda Co., Ltd. Benzoylurea derivatives. 4,713,396, Cl. 514-594.000.

Ikuta, Takashi: *See*—
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ILAPAK Research & Development S.A.: *See*—
Klinkel, Wolfgang, 4,713,047, Cl. 493-34.000.

Iles, Lawrence F.; and Goplen, Gary D., to Nelson Industries, Inc. Particulate trap exhaust muffler. 4,712,643, Cl. 181-231.000.

Ilex Corporation: *See*—
Conover, Gilbert; Minior, Thaddeus; and Willis, John P., 4,713,165, Cl. 204-403.000.

Illinois Tool Works Inc.: *See*—
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Hewison, George D.; and Harris, Terence E., 4,712,802, Cl. 277-212.00C.
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Imagawa, Koji: *See*—
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Imai, Nobuyuki: *See*—
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Hochstein, Peter A.; and Imai, Nobuyuki, 4,712,432, Cl. 73-862.360.

Imamura, Hideko: *See*—
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Imamura, Toru, to NEC Corporation. Method of making a capacitor with reduced dielectric breakdown. 4,713,357, Cl. 437-52.000.

Imao, Kayoko: *See*—
Tatsuoka, Toshio; Suzuki, Kenji; Imao, Kayoko; Satoh, Fumio; Miyano, Seiji; and Sumoto, Kunihiro, 4,713,453, Cl. 544-60.000.

Imataki, Hiroyuki: *See*—
Baba, Takeshi; Imataki, Hiroyuki; Usui, Masayuki; Serizawa, Takashi; and Nose, Hiroyasu, 4,712,882, Cl. 350-413.000.

Imhoff, Daniel. Automatic transmission for a bicycle. 4,713,042, Cl. 474-69.000.

Imperial Chemical Industries PLC: *See*—
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Cairns, John F.; and Cowell, Gawin W., 4,713,163, Cl. 204-296.000.
Cogswell, Frederic N.; and Measuria, Umakant, 4,713,283, Cl. 428-240.000.
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Impro Limited: *See*—
James, David R., 4,712,257, Cl. 5-83.000.

In-Situ, Inc.: *See*—
Wainwright, H. Kent, 4,712,505, Cl. 116-227.000.

Inaba, Yutaka: *See*—
Okada, Shinjiro; Kanbe, Junichiro; Tsuboyama, Akira; and Inaba, Yutaka, 4,712,877, Cl. 350-350.00S.

Inagaki, Mitukane; Ohta, Masaki; Hyodo, Akihiko; Takenaka, Kenji; Mitibata, Takashi; Suzuki, Shinichi; and Kayukawa, Hiroaki, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Variable displacement wobble plate type compressor with guide means for wobble plate. 4,712,982, Cl. 417-222.000.

Inagaki, Shigemi: *See*—
Nakashima, Seiichiro; Toyoda, Kenichi; Inagaki, Shigemi; and Otsuka, Kazuhisa, 4,712,972, Cl. 414-744.00R.

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Ing.C. Olivetti & Co. S.p.A.: *See*—
Graciotti, Alessandro; and Kutscha, Herbert A., 4,713,779, Cl. 364-521.000.

Ingersoll Cutting Tool Company: *See*—
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Ingle, John W. Marine craft. 4,713,030, Cl. 440-99.000.
Inhofe, James A., Jr.; and Evans, Harold J., to Central Plastics Company. Plastic pile protector and method of covering a pile with same. 4,713,129, Cl. 156-71.000.
Innis, Pamela B. Flower holder jewelry article. 4,712,389, Cl. 63-1.00R.
Inoh, Isamu: *See*—
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Inokuti, Yukio; Ito, Yoh; and Funahashi, Toshihiko, to Kawasaki Steel Corporation. Method of producing extra-low iron loss grain oriented silicon steel sheets. 4,713,123, Cl. 148-113.000.
Inomata, Kenichi, to Diesel Kiki Co., Ltd. Vane compressor provided with endless camming surface minimizing torque fluctuations. 4,712,987, Cl. 418-150.000.
Inoue, Hidekimi: *See*—
Ozaki, Haruhiko; Yamada, Tadatoshi; Machida, Kunio; Ohno, Kiyoshi; Shimazaki, Hirato; Inoue, Hidekimi; and Uji, Ryohei, 4,713,686, Cl. 358-107.000.
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Inoue, Takeshi: *See*—
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Insta, Inc.: *See*—
Khudenko, Boris M.; and Zbar, Jack, 4,713,102, Cl. 62-535.000.
Institut fur Motorenbau Professor Huber e.V.: *See*—
Schaffitz, Wolfgang, 4,712,528, Cl. 123-446.000.
Institute Technique de Cereales et des Fourrages: *See*—
Cornet, Michel; and Michel, Pierre, 4,712,362, Cl. 56-16.500.
Insystems, Inc.: *See*—
Fusek, Richard L.; and Lin, Lawrence H., 4,712,851, Cl. 350-3.600.
Intel Corporation: *See*—
Tsang, Chi-Hwa, 4,713,141, Cl. 156-643.000.
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Interlock Corporation: *See*—
Mobley, Dewey F.; Warren, Janice M.; Barbrick, August; and Eisenmann, Gregg A., 4,713,026, Cl. 439-845.000.
Intermedics, Inc.: *See*—
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International Acoustics Incorporated: *See*—
Katz, Hart V.; and Kien, Gerald A., 4,712,565, Cl. 128-715.000.
International Business Machine Corporation: *See*—
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Jones, Robert E., Jr.; Lee, Rodney E.; and Yeh, Tsu-Hsing, 4,713,711, Cl. 360-123.000.
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Andrusch, Georg; Baisch, Joachim; Barsuhn, Horst; Wernicke, Friedrich C.; and Wiedmann, Siegfried K., 4,713,814, Cl. 371-21.000.
Antonelli, Douglas C.; Branscomb, Patricia M.; Broockman, Eric C.; Dickson, LeRoy D.; Koppel, Caralee P.; Ossowski, Richard; and Stokes, Olen L., Jr., 4,713,785, Cl. 364-569.000.
Bryan, Dennis P.; and Rowe, John B., 4,713,815, Cl. 371-29.000.
Dutton, Patrick F.; and Jackson, Earl W., Jr., 4,713,751, Cl. 364-200.000.
Gunn, John B., 4,712,916, Cl. 356-241.000.
Tien, Zu-Jean, 4,713,140, Cl. 156-626.000.
International Computers Limited: *See*—
Cliff, John F.; and Walton, Robert R., 4,713,656, Cl. 340-723.000.
International Paper Co.: *See*—
Quick, James R.; Mitchell, James W.; and Cooley, Dennis A., 4,713,510, Cl. 219-10.55E.
Intertech Resources Inc.: *See*—
Gilman, Keith; and Lutz, Bruce W., 4,712,580, Cl. 137-512.150.
Iofis, Naum A.; Vettsel, Rudolf N.; Bukatov, Alexandr S.; and Khurtsilava, Semen G. Heart valve prosthesis. 4,713,071, Cl. 623-2.000.
Iravantchi, Siamak: *See*—
Myers, Jay E.; Myers, M. Todd; and Iravantchi, Siamak, 4,712,657, Cl. 190-28.000.
Irmscher, Klaus: *See*—
Kramer, Josef; Irmscher, Klaus; Prucher, Helmut; and Hesch, Rolf-Dieter, 4,713,465, Cl. 549-403.000.
Isaksson, Karl B.; and Svahn, Bror G. K., to Santrade Limited. Drill for generating of holes in a work piece. 4,712,952, Cl. 408-211.000.
Ishibashi, Hideyuki: *See*—
Takamiya, Kikuzo; Ishibashi, Hideyuki; and Kozakae, Kunitoshi, 4,712,450, Cl. 74-750.00B.
Ishida, Shiro, to Isuzu Motors Limited. Combustion chamber of internal combustion engine. 4,712,525, Cl. 123-263.000.
Ishiguro, Hiroyuki: *See*—
Kojima, Takao; and Ishiguro, Hiroyuki, 4,713,166, Cl. 204-425.000.
Ishihara, Mitsugu; and Machida, Yukihiko, to Sony Corporation. Data communication apparatus. 4,713,702, Cl. 360-79.000.
Ishii, Yugoro; Onozawa, Motohisa; and Katamine, Akihiko, to Kabushiki Kaisha Komatsu Seisakusho. Ultrasonic flaw detector probe. 4,712,428, Cl. 73-644.000.
Ishikawa, Takashi; Fukagawa, Hiroshi; and Matsui, Hiroyasu, to NEC Corporation. Picture block retransmission arrangement rapidly operable even when a transmission path has an inferior quality. 4,713,696, Cl. 358-261.000.
Ishimaru, Hitoshi; and Kobayashi, Toshiki, to Hitachi, Ltd.; and Hitachi Engineering Co., Ltd. Drain recovery system for condensate feedwater system of nuclear power plant. 4,713,209, Cl. 376-211.000.
Ishimatsu, Tsutomu, to Kawasaki Jukogyo Kabushiki Kaisha. Carriage for watercraft. 4,712,636, Cl. 180-198.000.
Ishimoto, Zenichi, to Nikko Co., Ltd. Operation contact system of transmitter for the radio-controlling toy. 4,713,499, Cl. 200-16.00D.
Ishioka, Yuji: *See*—
Takahashi, Ken; Hirata, Chiaki; and Ishioka, Yuji, 4,712,629, Cl. 180-68.100.
Ishizaki, Hirohumi: *See*—
Makimoto, Toshio; Nishimura, Sadahiko; Matsuo, Masayuki; Abiko, Toshio; Ishizaki, Hirohumi; Kanda, Minoru; Nunoya, Hidetsugu; and Komatsu, Mikio, 4,713,670, Cl. 343-700.0MS.
Ishizawa, Isamu; and Tamaki, Sigeo, to Hitachi, Ltd. Apparatus for adjusting specific volume of intake air for engine. 4,712,531, Cl. 123-556.000.
Ismail, Amr A., to Maine Wild Blueberry Co. Process for producing a semi-moist fruit product and the products therefrom. 4,713,252, Cl. 426-290.000.
Isobe, Ryosuke: *See*—
Asano, Masao; Isobe, Ryosuke; Yamauchi, Yasuhisa; and Yamagishi, Hiroaki, 4,713,293, Cl. 428-403.000.
Isuzu Motors Limited: *See*—
Ishida, Shiro, 4,712,525, Cl. 123-263.000.
Ito, Hayami: *See*—
Ogawa, Takayuki; Ito, Hideaki; Kimura, Naokazu; Ito, Hayami; Tatsumi, Shuhei; Takao, Shoichi; Suzuki, Nitaro; Watanabe, Takashi; Shinano, Kunizo; Kuwabara, Takashi; and Aoki, Kaoru, 4,712,742, Cl. 241-20.000.
Ito, Hideaki: *See*—
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Ito, Katsunori: *See*—
Abe, Tomoaki; Fujisawa, Hideya; Omori, Norio; Kinugawa, Masumi; Ito, Katsunori; Akiyama, Susumu; Mizuno, Tiaki; and Yamada, Toshitaka, 4,713,765, Cl. 364-431.050.
Ito, Toshimitsu: *See*—
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Ito, Yoh: *See*—
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Itoh, Hajime: *See*—
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Itoh, Kenji: *See*—
Yamazaki, Shunpei; Itoh, Kenji; and Nagayama, Susumu, 4,713,518, Cl. 219-121.0LM.
Itoh, Masao: *See*—
Akiyama, Shigeru; Ueno, Hidetoshi; Imagawa, Koji; Kitahara, Akira; Nagata, Sumio; Morimoto, Kazuo; Nishikawa, Tooru; and Itoh, Masao, 4,713,277, Cl. 428-131.000.
ITT Corporation: *See*—
Corrales, Patrick G., 4,712,860, Cl. 350-96.200.
ITT Electro Optical Products, a division of ITT Corporation: *See*—
Porter, David R.; Bowen, James H.; and Holland, John M., 4,713,841, Cl. 455-608.000.
Iversen, Arthur H. Heat sink structure. 4,712,609, Cl. 165-80.400.
Iwanami, Teruo: *See*—
Hasegawa, Kenji; Sato, Tetsuo; and Iwanami, Teruo, 4,713,266, Cl. 427-412.500.
Iyer, Venkatraman; and Lee, Gil S., to Advanced Micro Devices, Inc. Linear feedback shift register for circuit design technology validation. 4,713,605, Cl. 324-73.00R.
J.A.D. Enterprises, Inc.: *See*—
DePasquale, John A.; Segalowitz, Ivar R.; and Andolfi, Ceasar P., 4,712,359, Cl. 53-460.000.
J. I. Case Company: *See*—
Birkenbach, Eugen J.; Eversole, Brad K.; and Magee, Kevin J., 4,712,622, Cl. 172-328.000.
J. Strobel & Sohne GmbH & Co.: *See*—
Jagielski, Johannes, 4,712,495, Cl. 112-176.000.
Jabarin, Saleh A.; and Ajmera, Prakash R., to Owens-Illinois Plastic Products Inc. Heatset multilayer container. 4,713,269, Cl. 428-35.000.
Jabarin, Saleh A.; and Ajmera, Prakash R., to Owens-Illinois Plastic Products Inc. Heatset high barrier container. 4,713,270, Cl. 428-35.000.
Jackson, Earl W., Jr.: *See*—
Dutton, Patrick F.; and Jackson, Earl W., Jr., 4,713,751, Cl. 364-200.000.
Jackson, Owen E.; and Donaldson, Thomas W. Device for recovering fluid from a well. 4,712,667, Cl. 198-643.000.
Jagielski, Johannes, to J. Strobel & Sohne GmbH & Co. Chain-stitching and blind-stitching machine for point-sewing articles. 4,712,495, Cl. 112-176.000.
Jagsch, Karl-Heinz: *See*—
Sulterlin, Norbert; Blitz, Hans-Dieter; Mager, Theodor; Jagsch, Karl-Heinz; and Tessmer, Dieter, 4,713,434, Cl. 526-62.000.
Jalava, Antti, to Nakovammaisten Keskusliitto ry. Device for sending and receiving a message. 4,713,495, Cl. 178-2.00R.
James, David R., to Impro Limited. Invalid hoists. 4,712,257, Cl. 5-83.000.

James, Timothy W.; and Wyman, David. Cold plate refrigeration method and apparatus. 4,712,387, Cl. 62-434.000.

Janes, Norman F.: *See—*
Elliott, Michael; Janes, Norman F.; and Khambay, Bhupinder P. S., 4,713,392, Cl. 514-464.000.

Janiel, Peter A.: *See—*
Gartner, Georg F.; Janiel, Peter A.; and Lydtin, Hans-Jurgen, 4,713,259, Cl. 427-39.000.

Janos, Alan C.: *See—*
Furth, Harold P.; Janos, Alan C.; Uyama, Tadao; and Yamada, Masaaki, 4,713,208, Cl. 376-137.000.

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Jansen, Richard F.: *See—*
Birum, Gail H.; and Jansen, Richard F., 4,713,489, Cl. 564-90.000.

Jantzen, Steve L.: *See—*
Jantzen, Steven L., 4,712,735, Cl. 238-94.000.

Jantzen, Steven L., to Jantzen, Steve L. Prestressed concrete cross tie having increased fatigue life. 4,712,735, Cl. 238-94.000.

Japan Synthetic Rubber Co., Ltd.: *See—*
Nishikawa, Yasuo; Okita, Tsutomu; Mukaida, Yoshito; Niinomi, Masahiro; Yanagihara, Kenji; and Kimura, Mituo, 4,713,287, Cl. 428-336.000.

Jarman, Davis R.; and Hinson, Virgil H., to Grabber Manufacturing Company. Swivel pull tower. 4,712,417, Cl. 72-447.000.

Jasin, Maria; and Schimmel, Paul R., to Massachusetts Institute of Technology. Method for deletion of a gene from a bacteria. 4,713,337, Cl. 435-172.300.

Jean, Pierre-Paul. Vehicle light control system for automotive vehicles. 4,713,584, Cl. 315-83.000.

Jenkins, Robert H., Jr.; Mitchell, Edward; Gaetani, Frank J.; Mahusky, John J.; and Hall, Marilyn, to Texaco Inc. Carrier composition for introducing additives to a motor fuel. 4,713,087, Cl. 44-53.000.

Jeno, Pojbics: *See—*
Janos, Antal; and Jeno, Pojbics, 4,712,822, Cl. 296-24.00R.

Jensen, Jakob, to Logicar A/S. Convertible car. 4,712,827, Cl. 296-99.00R.

Jeschke, Willi, to Heidelberger Druckmaschinen AG. Device for securing flexible printing plates under tension on a plate cylinder of a rotary printing machine. 4,712,476, Cl. 101-415.100.

Jidosha Kiki Co., Ltd.: *See—*
Yanagawa, Ichiro; and Wachi, Yuji, 4,713,094, Cl. 55-163.000.

Jobst Institute: *See—*
Tucker, Kevin M.; and Peeler, Donald, 4,712,540, Cl. 128-76.00R.

Joh. Winklhofer & Sohne: *See—*
Biedermann, Adam, 4,713,043, Cl. 474-111.000.

Johansson, Hans; and Goras, Anders, to Saab-Scania AB. Arrangement in a magnetic position indicator. 4,712,420, Cl. 73-118.100.

Johncock, Annette; and Hudgens, Stephen J., to Energy Conversion Devices, Inc. Enhancement layer for positively charged electrophotographic devices and method for decreasing charge fatigue through the use of said layer. 4,713,309, Cl. 430-65.000.

Johns Hopkins University: *See—*
Wagner, Henry N., Jr., 4,712,561, Cl. 128-654.000.

Johnson, Arthur C. W. Low-intensity infrared heating system with effluent recirculation. 4,712,734, Cl. 237-70.000.

Johnson, Calvin K.: *See—*
Armbruster, David R.; and Johnson, Calvin K., 4,713,294, Cl. 428-404.000.

Johnson, D. Dale, to Ex-Cell-O Corporation. Actuator locking mechanism. 4,712,471, Cl. 92-24.000.

Johnson, Don L.: *See—*
Castelli, Joseph Q.; and Johnson, Don L., 4,712,843, Cl. 312-242.000.

Johnson, Fred L., to Thomas, R. L.; and Rouse, W. J., a part interest. Power output mechanism for an internal combustion engine. 4,712,518, Cl. 123-48.00B.

Johnson, John A.: *See—*
Hood, Donald W.; Johnson, John A.; and Smartt, Herschel B., 4,712,722, Cl. 228-104.000.

Johnson & Johnson Products, Inc.: *See—*
Schiraldi, Michael T.; Perl, Martin M.; and Rubin, Howard, 4,713,243, Cl. 424-151.000.

Johnson, Mack E.: *See—*
Price, Macy J.; Johnson, Mack E.; and Acker, Norman J., 4,712,842, Cl. 312-196.000.

Johnson, Roger E., to White Consolidated Industries, Inc. High temperature balanced valve trim. 4,712,769, Cl. 251-324.000.

Johnson, Roy E. Split elastomer ring for repairing potheads and process of repairing a pothead therewith. 4,712,800, Cl. 277-1.000.

Johnson, William B., to Ingersoll Cutting Tool Company. On-edge end-milling insert. 4,712,949, Cl. 407-42.000.

Johnston, Norman W., to Libbey-Owens-Ford Co. Method of assembling a vehicle from modular components. 4,712,287, Cl. 29-469.000.

Johnston, William H., to CSL Group Inc., The. Articulated boom mechanism for unloading bulk solid material from a ship. 4,712,962, Cl. 414-144.000.

Jones, Darrell L.: *See—*
Lim, Jack S.; and Jones, Darrell L., 4,712,620, Cl. 166-355.000.

Jones, David M.: *See—*
Szelke, Michael; Jones, David M.; and Hallett, Allan, 4,713,445, Cl. 530-330.000.

Jones, Howell A.: *See—*
Hills, Karen F.; and Jones, Howell A., 4,713,769, Cl. 364-464.000.

Jones, Robert E., Jr.; Lee, Rodney E.; and Yeh, Tsu-Hsing, to International Business Machines. Thin film magnetic transducer having center tapped winding. 4,713,711, Cl. 360-123.000.

Joseph Vogele AG: *See—*
Saam, Werner, 4,712,649, Cl. 184-7.400.

Joseph, Werner: *See—*
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Josephs, Mark A., to North American Philips Consumer Electronics Corp. Getter assembly with diffusion directing structure. 4,713,578, Cl. 313-481.000.

Julian A. McDermott Corp.: *See—*
McDermott, Julian A., 4,713,653, Cl. 340-654.000.

Jundt, Werner: *See—*
Arnold, Herbert; Horbelt, Michael; and Jundt, Werner, 4,713,812, Cl. 371-10.000.

Jung, Rolf, to Laeis-Werke AG. Process of manufacturing a one-piece molding from a dry ceramic mass. 4,713,204, Cl. 264-120.000.

Junghaus, Jurgen R.: *See—*
Kunz, Rino E.; Junghaus, Jurgen R.; Knus, Jean A.; Murbach, Urs; and Tuor, Marcel F., 4,713,537, Cl. 250-227.000.

Junius, V. Bruce: *See—*
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Jusseau, Marcel: *See—*
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Juttner, Heinz: *See—*
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Kaar, David R.: *See—*
Sowman, Harold G.; and Kaar, David R., 4,713,300, Cl. 428-547.000.

Kabushiki Kaisha Ishida Koki Seisakusho: *See—*
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Kabushiki Kaisha Kamiuchi Denki Seisakusho: *See—*
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Kabushiki Kaisha Kobe Seiko Sho: *See—*
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Kabushiki Kaisha Komatsu Seisakusho: *See—*
Ishii, Yugoro; Onozawa, Motohisa; and Katamine, Akihiko, 4,712,428, Cl. 73-644.000.
Wakasa, Satoshi; and Okazaki, Toru, 4,712,985, Cl. 417-486.000.
Yoshida, Toshiyuki; and Arai, Mitsuru, 4,712,377, Cl. 60-444.000.

Kabushiki Kaisha Shinsangyokaihatsu: *See—*
Sumiya, Koji; and Moroto, Shuzo, 4,712,635, Cl. 180-197.000.

Kabushiki Kaisha Takuma: *See—*
Uno, Kunihiko; Tamade, Yoshinori; Horino, Seiya; and Kodera, Tamotsu, 4,712,741, Cl. 241-16.000.

Kabushiki Kaisha Toshiba: *See—*
Hirata, Hidetoshi, 4,713,528, Cl. 219-492.000.
Hiruta, Yoichi, 4,713,356, Cl. 437-41.000.
Kessoku, Hirobumi, 4,713,673, Cl. 355-4.000.
Kimura, Motohiko, 4,712,969, Cl. 414-730.000.
Kobata, Hiroshi; and Kojima, Tadashi, 4,713,802, Cl. 369-59.000.
Toyoda, Eiji; and Hayashi, Soichiro, 4,713,722, Cl. 361-141.000.
Tsugaru, Kazunori; and Sugimoto, Yasuhiro, 4,713,600, Cl. 323-351.000.
Yoshizawa, Shuji; Mitani, Wataru; Yamamoto, Mariko; Sanjoh, Akira; and Ikezue, Tatsuya, 4,713,308, Cl. 430-65.000.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See—*
Inagaki, Mitukane; Ohta, Masaki; Hyodo, Akihiko; Takenaka, Kenji; Mitibata, Takashi; Suzuki, Shinichi; and Kayukawa, Hiroaki, 4,712,982, Cl. 417-222.000.

Kaettlitz, Wolfgang: *See—*
Hofmann, Franz; Trapp, Hans G.; Rietzscher, Rolf; Otto, Jurgen; Kaettlitz, Wolfgang; and Trinki, Gerd, 4,713,180, Cl. 210-773.000.

Kai Cutlery Center Co., Ltd.: *See—*
Saito, Tatsuya, 4,712,301, Cl. 30-47.000.

Kaihara, Toshikazu: *See—*
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Kain, Richard Y.: *See—*
Boebert, William E.; and Kain, Richard Y., 4,713,753, Cl. 364-200.000.

Kaiser, Timothy D.; and Ackel, Gary P., to Hazelett Strip-Casting Corporation. Pool-level sensing probe and automatic level control for twin-belt continuous metal casting machines. 4,712,602, Cl. 164-453.000.

Kajihara, Isamu, to Morinaga & Co., Ltd. Apparatus for separating granular solids from carrying gas. 4,713,096, Cl. 55-204.000.

Kakuzen, Hideo: *See—*
Yoshida, Masaaki; Endo, Shigeki; Kisanuki, Shigeru; and Kakuzen, Hideo, 4,713,107, Cl. 65-157.000.

Kalewicz, Zdzislaw: *See—*
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Kallay, Anna: *See—*
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Kaller, Sigurd. Sealing gasket assembly. 4,712,801, Cl. 277-71.000.

Kalnes, Tom N.: *See*—
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Kamata, Mitsuo; and Yamashita, Yutaka, to Nissan Shatai Company, Limited. Anti-vibration structure of a steering arrangement. 4,712,446, Cl. 74-492.000.
Kaminaga, Hiromitsu, to Yoshida Kogyo, K. K. Apparatus for connecting curtain wall units. 4,712,345, Cl. 52-235.000.
Kamio, Masaru: *See*—
Sekimura, Nobuyuki; Kamio, Masaru; Takao, Hideaki; Motoi, Taiko; and Murata, Tatsuo, 4,712,874, Cl. 350-339.00F.
Kamitani, Hiroshi: *See*—
Sekine, Fumimaro; Kurosaki, Tomihiro; Ukena, Toshinao; and Kamitani, Hiroshi, 4,713,487, Cl. 562-587.000.
Kamiya, Makoto: *See*—
Hosomizu, Hiroshi; Tsuji, Kenji; and Kamiya, Makoto, 4,712,902, Cl. 354-416.000.
Kamiyama, Kiichi; and Kato, Yasuo, to Tokyo Kogaku Kikai Kabushiki Kaisha. Ocular position measuring apparatus. 4,712,895, Cl. 351-243.000.
Kamo, Jun: *See*—
Takemura, Tohru; Itoh, Hajime; Kamo, Jun; and Yoshida, Haruhiko, 4,713,292, Cl. 428-373.000.
Kamo, Takashi: *See*—
Ikai, Tadayoshi; and Kamo, Takashi, 4,712,419, Cl. 73-116.000.
Kamo, Yuichi; and Mikami, Nobuo, to NEC Corporation. Polarized electromagnetic relay. 4,713,638, Cl. 335-79.000.
Kamoun, Ahmed: *See*—
Chaveron, Henri; Pontillon, Jean; Billon, Michel; Adenier, Herve ; and Kamoun, Ahmed, 4,713,256, Cl. 426-631.000.
Kamp, Eugene L., to A. B. Chance Company. Three phase vacuum switch operating mechanism with anti-bounce device for interrupter contacts. 4,713,503, Cl. 200-144.00B.
Kanai, Tadashi: *See*—
Sakai, Hideaki; and Kanai, Tadashi, 4,713,454, Cl. 544-258.000.
Kanbara, Yukio: *See*—
Kanou, Kazuo; Shinoda, Takamitu; and Kanbara, Yukio, 4,713,411, Cl. 524-560.000.
Kanbe, Junichiro; and Yoshinaga, Kazuo, to Canon Kabushiki Kaisha. Liquid crystal device. 4,712,872, Cl. 350-333.000.
Kanbe, Junichiro; and Okada, Shinjiro, to Canon Kabushiki Kaisha. Liquid crystal optical device. 4,712,873, Cl. 350-337.000.
Kanbe, Junichiro: *See*—
Okada, Shinjiro; Kanbe, Junichiro; Tsuboyama, Akira; and Inaba, Yutaka, 4,712,877, Cl. 350-350.00S.
Tsuboyama, Akira; Katagiri, Kazuharu; and Kanbe, Junichiro, 4,712,875, Cl. 350-344.000.
Kanda, Minoru: *See*—
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Kane, Peter E., to Polaroid Corporation. Part positioning apparatus and method. 4,712,974, Cl. 414-757.000.
Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See*—
Nakashima, Toshimitsu; Okada, Wataru; and Mitani, Toragoro, 4,713,443, Cl. 528-499.000.
Kano, Kenji: *See*—
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Kanou, Kazuo; Shinoda, Takamitu; and Kanbara, Yukio, to Dainichiseika Color & Chemicals Mfg. Co., Ltd. Pigment composition and preparation process thereof. 4,713,411, Cl. 524-560.000.
Kansai Netsukagaku Kabushiki Kaisha: *See*—
Yokoe, Jintaro; Takeuchi, Masami; and Tsuji, Toshiaki, 4,713,090, Cl. 55-68.000.
Kanzaki Paper Mfg. Co., Ltd.: *See*—
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Omatsu, Masayuki; Yonese, Naoki; and Kondo, Mitsuru, 4,713,488, Cl. 564-397.000.
Kso Corporation: *See*—
Sekine, Fumimaro; Kurosaki, Tomihiro; Ukena, Toshinao; and Kamitani, Hiroshi, 4,713,487, Cl. 562-587.000.
Kapolnas, Marta: *See*—
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Karlis, Robert G.; Dole, Charles M.; Webster, Gary L.; and Andersen, George J., to Cadbury Schweppes, PLC. Gas cylinder coupling and weighting mechanism for a carbonated drink dispenser. 4,712,713, Cl. 222-3.000.
Karnitscher, Tamas: *See*—
David, Dezso; Rovo, Peter; Sipos nee Richter, Terez; Molnar, Gyorgy; Deme, Istvan; and Karnitscher, Tamas, 4,713,078, Cl. 8-94.150.
Kasahara, Toshiharu; Ogami, Takayuki; and Kitayoshi, Hitoshi, to Takeda Riken Kogyo Kabushikikaisha. Burst signal generator. 4,713,788, Cl. 364-718.000.
Kasboske, George C., to Quintech Corporation. Multiple color lamp. 4,713,736, Cl. 362-214.000.
Kaschig, Jurgen; and Finter, Jurgen, to Ciba-Geigy Corporation. Radiation-sensitive polymers which form a metal complex, process for the polymerization of acetylene, and coated material. 4,713,422, Cl. 525-326.700.
Kasemo, Bengt: *See*—
Branemark, Per-Ingvar; Kasemo, Bengt; and Lausmaa, Jukka, 4,712,681, Cl. 206-438.000.
Kashio, Yoshiaki: *See*—
Mogi, Tomonori; and Kashio, Yoshiaki, 4,712,637, Cl. 180-219.000.
Kashiwagi, Shigeru, to Victor Company of Japan, Ltd. Apparatus for linearity correction on horizontal deflection. 4,713,589, Cl. 315-400.000.
Kasprzak, David P., to Celotex Corporation, The. Vinyl siding. 4,712,351, Cl. 52-573.000.
Kastner, Ralph E.: *See*—
Michel, Karl H.; and Kastner, Ralph E., 4,713,331, Cl. 435-68.000.
Katagiri, Kazuharu: *See*—
Tsuboyama, Akira; Katagiri, Kazuharu; and Kanbe, Junichiro, 4,712,875, Cl. 350-344.000.
Katagiri, Takashi: *See*—
Tsujimoto, Keizo; Katagiri, Takashi; Ichihashi, Eiji; and Otsubo, Hitoshi, 4,712,366, Cl. 57-245.000.
Katamine, Akihiko: *See*—
Ishii, Yugoro; Onozawa, Motohisa; and Katamine, Akihiko, 4,712,428, Cl. 73-644.000.
Katchko, John; Kirz, Karel; and Plaisance, Thomas H., to DeSoto, Inc. Silicone release coating emulsions which stratify when baked. 4,713,410, Cl. 524-500.000.
Kato, Hiroshi: *See*—
Sakamoto, Teruo; Kawai, Sadao; Noda, Kinzaburo; Takeda, Toyohiko; and Kato, Hiroshi, 4,713,247, Cl. 424-461.000.
Kato, Masatake; Tsuji, Sadahiko; and Asano, Toshiaki, to Canon Kabushiki Kaisha. Rear focus zoom lens. 4,712,883, Cl. 350-427.000.
Kato, Yasuo: *See*—
Kamiyama, Kiichi; and Kato, Yasuo, 4,712,895, Cl. 351-243.000.
Kato, Yutaka, to Matsushita Electric Works, Ltd. Jack for telephone set. 4,713,016, Cl. 439-137.000.
Katoh, Hiroyuki, to Sharp Kabushiki Kaisha. Continuous substantially planar microwave oven door assembly. 4,713,511, Cl. 219-10.55D.
Katoh, Mitsutaka: *See*—
Mikami, Kazuo; Yamashita, Tsukasa; and Katoh, Mitsutaka, 4,712,854, Cl. 350-96.120.
Katsuno, Toshiyasu: *See*—
Nagai, Toshinari; Masui, Takatoshi; Satou, Yasushi; and Katsuno, Toshiyasu, 4,712,373, Cl. 60-274.000.
Katsuragawa, Mitsuhiro: *See*—
Suzuki, Nobuyuki; Shimizu, Masao; and Katsuragawa, Mitsuhiro, 4,713,571, Cl. 310-316.000.
Katz, Hart V.; and Kien, Gerald A., to International Acoustics Incorporated. Method and apparatus for evaluating of artificial heart valves. 4,712,565, Cl. 128-715.000.
Kaufman, Lance R. Isolation transformer. 4,713,723, Cl. 361-179.000.
Kauss, Wolfgang; and Mucheyer, Norbert, to Mannesmann Rexroth GmbH. Safety device for priority hydraulic consumer. 4,712,375, Cl. 60-405.000.
Kavesh, Sheldon: *See*—
Kwon, Young D.; Kavesh, Sheldon; and Prevorsek, Dusan C., 4,713,290, Cl. 428-364.000.
Kawaguchi, Takeshi; and Kawano, Akio, to Honda Giken Kogyo Kabushiki Kaisha. Suspension system for motorcycles. 4,712,638, Cl. 180-219.000.
Kawai, Sadao: *See*—
Sakamoto, Teruo; Kawai, Sadao; Noda, Kinzaburo; Takeda, Toyohiko; and Kato, Hiroshi, 4,713,247, Cl. 424-461.000.
Kawakami, Yoshio: *See*—
Yoda, Kuniichi; Kitaura, Eiji; Tsunoda, Tsutomu; and Kawakami, Yoshio, 4,713,278, Cl. 428-141.000.
Kawamata, Syooichi: *See*—
Takahashi, Tadashi; Miyashita, Kunio; and Kawamata, Syooichi, 4,713,613, Cl. 324-208.000.
Kawamori, Yoshizo: *See*—
Horihata, Katsushi; and Kawamori, Yoshizo, 4,713,672, Cl. 346-108.000.
Kawamura, Hideaki; Sakurada, Nobuaki; Sato, Yuichi; and Watanabe, Yoshitaka, to Canon Kabushiki Kaisha. Picture producing apparatus using multiple dot forming units and recording materials of different concentrations. 4,713,701, Cl. 358-298.000.
Kawamura, Hideaki: *See*—
Watanabe, Yoshitaka; Sakurada, Nobuaki; Kawamura, Hideaki; and Sato, Yuichi, 4,713,746, Cl. 346-1.100.
Kawamura, Naoto; and Abe, Shunichi, to Canon Kabushiki Kaisha. Image processing apparatus for discriminating and processing different formats of color image signals. 4,713,684, Cl. 358-78.000.
Kawanishi, Toshiyuki: *See*—
Shimada, Masaru; Kawanishi, Toshiyuki; Murakami, Kakuji; Aruga, Tamotsu; and Uemura, Hiroyuki, 4,713,113, Cl. 106-22.000.
Kawano, Akio: *See*—
Kawaguchi, Takeshi; and Kawano, Akio, 4,712,638, Cl. 180-219.000.
Kawano, Katsumi: *See*—
Kosaka, Michitaka; Kawano, Katsumi; and Miyamoto, Shoji, 4,713,768, Cl. 364-460.000.
Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Ishimatsu, Tsutomu, 4,712,636, Cl. 180-198.000.
Ogawa, Takayuki; Ito, Hideaki; Kimura, Naokazu; Ito, Hayami; Tatsumi, Shuhei; Takao, Shoichi; Suzuki, Nitaro; Watanabe, Takashi; Shinano, Kunizo; Kuwabara, Takashi; and Aoki, Kaoru, 4,712,742, Cl. 241-20.000.

Kawasaki Steel Corporation: *See*—
Iida, Sachihiro, 4,713,125, Cl. 148-128.000.
Inokuti, Yukio; Ito, Yoh; and Funahashi, Toshihiko, 4,713,123, Cl. 148-113.000.
Ohta, Norio; Yanagishima, Fumiya; Kaihara, Toshikazu; Kishida, Akira; Sato, Kuniaki; and Ochiai, Masanobu, 4,713,154, Cl. 204-145.00R.
Kawashima, Yoshinori: *See*—
Suzuki, Takahisa; Kuwahara, Shinichi; and Kawashima, Yoshinori, 4,712,633, Cl. 180-149.000.
Kay, Leslie. Method of and apparatus for providing object data by machine vision. 4,713,798, Cl. 367-96.000.
Kaye, Gordon E.: *See*—
Marshall, Howard B.; Kaye, Gordon E.; and Lopata, Ira L., 4,713,005, Cl. 433-180.000.
Kayukawa, Hiroaki: *See*—
Inagaki, Mitukane; Ohta, Masaki; Hyodo, Akihiko; Takenaka, Kenji; Mitibata, Takashi; Suzuki, Shinichi; and Kayukawa, Hiroaki, 4,712,982, Cl. 417-222.000.
Kazarian, Robert V.: *See*—
Arutjunian, Norair S.; Kornena, Elena P.; Kazarian, Robert V.; Ponomareva, Natalya A.; Redko, Grigory V.; Sakhno, Lidia T.; and Zhidkova, Irina S., 4,713,155, Cl. 204-155.000.
Kearney-National, Inc.: *See*—
Osborne, Anthony, 4,713,500, Cl. 200-48.0KB.
Keehn, William T.: *See*—
Tonyes, Henry J.; Keehn, William T.; German, Harold W.; and Hill, Brian S., 4,713,250, Cl. 426-2.000.
Keenlyside, Michael: *See*—
Turner, David W.; Dixon, Andrew J.; Gehring, Karl A.; and Keenlyside, Michael, 4,713,833, Cl. 378-119.000.
Keleher, Daniel B.: *See*—
Brizgis, Lawrence J.; Keleher, Daniel B.; and Bandelow, Vernon D., 4,713,781, Cl. 364-552.000.
Kelly, L. Thomas; Hamel, Esther V. M.; and Bielka, Robert P. Implanted muscle powered drug dispensing system. 4,713,054, Cl. 604-89.000.
Kemmerer, Klemens; and Hummel, Peter, to M.A.N.-Roland Druckmaschinen Aktiengesellschaft. Inking roller for printing machines. 4,712,475, Cl. 101-348.000.
Kendall Company, The: *See*—
Li, Felipe S., 4,713,136, Cl. 156-229.000.
Kenney Manufacturing Company: *See*—
Percivalle, Glenn S.; and Blanchette, Ronald L., 4,712,457, Cl. 82-47.000.
Kent, Eric G., to Polysar Limited. Methods of adhering a self-fusing tape to a substrate. 4,713,133, Cl. 156-162.000.
Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See*—
Weirich, Walter; Barnert, Heiko; Oertel, Michael; and Schulten, Rudolf, 4,713,234, Cl. 423-648.00R.
Woike, Theo; Krasser, Wolfgang; and Haussuhl, Siegfried, 4,713,795, Cl. 365-119.000.
Kerth, Juergen; and Vogt, Heinz, to BASF Aktiengesellschaft. Preparation of ethene polymers by means of a Ziegler catalyst system. 4,713,430, Cl. 526-159.000.
Kervagoret, Gilbert, to Bendix France. Assisted steering system for a motor vehicle. 4,712,631, Cl. 180-143.000.
Kervagoret, Gilbert, to Bendix France. Assisted steering system for a motor vehicle. 4,712,632, Cl. 180-143.000.
Kerwin, Daniel. Machine and method for applying miniaturized indicia to articles. 4,713,128, Cl. 156-64.000.
Kessler, Milton. One-piece cap and brush and method of forming it. 4,712,936, Cl. 401-129.000.
Kessoku, Hirobumi, to Kabushiki Kaisha Toshiba. Image forming apparatus in which multiple developing units are supported and moved relative to an image carrier. 4,713,673, Cl. 355-4.000.
Kesten, Arthur S.; Haught, Alan F.; and Couch, Harold T., to United Technologies Corporation. Chemical heat pipe employing self-driven chemical pump based on a molar increase. 4,712,610, Cl. 165-104.120.
Kester, Eugene A.; Reeves, Scott P.; and Zemanek, Danny, to Photoflex Products. Shock corded tripod stand. 4,712,756, Cl. 248-165.000.
Kevex Corporation: *See*—
Turner, David W.; Dixon, Andrew J.; Gehring, Karl A.; and Keenlyside, Michael, 4,713,833, Cl. 378-119.000.
Keyes, Melvin H., to Owens-Illinois Glass Container Inc. Protein modification to provide enzyme activity. 4,713,335, Cl. 435-183.000.
Khambay, Bhupinder P. S.: *See*—
Elliott, Michael; Janes, Norman F.; and Khambay, Bhupinder P. S., 4,713,392, Cl. 514-464.000.
Khromov, Gennady L.: *See*—
Babaian, Eduard A.; Gerasimova, Galina A.; Davydov, Anatoly B.; Utyamyshev, Rustam I.; Khromov, Gennady L.; Metelitsa, Vladimir I.; Vikhert, Anatoly M.; Savvateev, Konstantin L.; Piotrovsky, Vladimir K.; and Novikova, Elizaveta B., 4,713,239, Cl. 424-81.000.
Khudenko, Boris M.; and Zbar, Jack, to Insta, Inc. Method of concentrating multicomponent liquid products. 4,713,102, Cl. 62-535.000.
Khurtsilava, Semen G.: *See*—
Iofis, Naum A.; Vettsel, Rudolf N.; Bukatov, Alexandr S.; and Khurtsilava, Semen G., 4,713,071, Cl. 623-2.000.
Kicherer, Robert; Schreder, Felix; and Dorner, Leonhard, to EGO Elektro Gerate Blanc u. Fischer. Radiant heating unit. 4,713,527, Cl. 219-464.000.
Kidani, Morio. Ball end mill cutter. 4,712,948, Cl. 407-42.000.
Kidd, Geoffrey; Maher, Daniel V.; and Cywinski, Jozef, to Bio Medical Research Ltd. Electrical stimulation of muscle. 4,712,558, Cl. 128-421.000.
Kiddie Products, Inc.: *See*—
Thom, Paul, 4,713,035, Cl. 446-141.000.
Kien, Gerald A.: *See*—
Katz, Hart V.; and Kien, Gerald A., 4,712,565, Cl. 128-715.000.
Kikendall, Garth D.: *See*—
Sparling, Kenneth P.; Incardona, Angelo; Kikendall, Garth D.; Richardson, David G.; Wood, Ronald E.; and Bakow, Leon, 4,712,958, Cl. 411-506.000.
Kikuchi, Yoshikazu; and Nakao, Reiro, to Corona Engineering Co., Ltd. Electrostatic precipitator. 4,713,092, Cl. 55-130.000.
Killop, James T., to Anderson-Cook, Inc. Coarse pitch spline rolling. 4,712,408, Cl. 72-88.000.
Killop, James T., to Anderson-Cook, Inc. Threading and projection forming on different size diameters. 4,712,409, Cl. 72-88.000.
Killop, James T., to Anderson-Cook, Inc. Method and apparatus for cold sizing a round workpiece having multiple diameters. 4,712,410, Cl. 72-108.000.
Kim, Heung-Tai, to B. F. Goodrich Company, The. Extruder with screw having core portion of polygonal cross-section. 4,712,992, Cl. 425-207.000.
Kim, Jung J. Pressure applying apparatus. 4,712,539, Cl. 128-57.000.
Kim, Yong W.; and Harding, Thomas W., to Lehigh University. Electron attachment apparatus and method. 4,713,548, Cl. 250-423.00R.
Kimball, David B.; and Kip, Ruloff F., Jr., to American Telephone and Telegraph Company, AT&T Information Systems; and AT&T Bell Laboratories. Bounce-nullifying switch unit. 4,713,564, Cl. 307-542.100.
Kimberly-Clark Corporation: *See*—
Abel, Kent W.; and Attoe, Gary N., 4,713,132, Cl. 156-73.100.
Wang, Kenneth Y.; and Yeo, Richard S., 4,713,068, Cl. 604-366.000.
Wang, Kenneth Y.; and Yeo, Richard S., 4,713,069, Cl. 604-378.000.
Kimoto, Kiyoharu: *See*—
Sugahara, Kooichi; Shinno, Yoshio; and Kimoto, Kiyoharu, 4,712,519, Cl. 123-52.00M.
Kimpel, Rolf D., to Siemens Aktiengesellschaft. Electromechanical component with sealed housing. 4,713,727, Cl. 361-334.000.
Kimura, Kiyoshi; and Hara, Osamu, to Alps Electric Co., Ltd. Coordinate input device. 4,713,496, Cl. 178-18.000.
Kimura, Mituo: *See*—
Nishikawa, Yasuo; Okita, Tsutomu; Mukaida, Yoshito; Niinomi, Masahiro; Yanagihara, Kenji; and Kimura, Mituo, 4,713,287, Cl. 428-336.000.
Kimura, Motohiko, to Kabushiki Kaisha Toshiba. Expandable and contractable arms. 4,712,969, Cl. 414-730.000.
Kimura, Naokazu: *See*—
Ogawa, Takayuki; Ito, Hideaki; Kimura, Naokazu; Ito, Hayami; Tatsumi, Shuhei; Takao, Shoichi; Suzuki, Nitaro; Watanabe, Takashi; Shinano, Kunizo; Kuwabara, Takashi; and Aoki, Kaoru, 4,712,742, Cl. 241-20.000.
Kimura, Shinichi, to Sharp Kabushiki Kaisha. Electric heating appliance detachably mounted in a motor vehicle. 4,713,522, Cl. 219-202.000.
Kinetic Systems Corporation: *See*—
Hayes, Michael L.; Mahr, Paul S.; and Tippie, John W., 4,713,770, Cl. 364-474.000.
King, Donald J.: *See*—
Lederman, Frederick E.; and King, Donald J., 4,712,661, Cl. 192-45.000.
King, James L., to General Electric Company. Method of assembling a stationary assembly for a dynamoelectric machine. 4,712,292, Cl. 29-596.000.
Kingston, Arthur G.; and DeLong, Carl R. Adjustable template for positioning tile of various sizes. 4,712,309, Cl. 33-527.000.
Kinoshita, Mitsuo, to Fanuc Ltd. Cut contour display method in wire electric discharge machine. 4,713,517, Cl. 219-69.00W.
Kinugawa, Masumi: *See*—
Abe, Tomoaki; Fujisawa, Hideya; Omori, Norio; Kinugawa, Masumi; Ito, Katsunori; Akiyama, Susumu; Mizuno, Tiaki; and Yamada, Toshitaka, 4,713,765, Cl. 364-431.050.
Kioritz Corporation: *See*—
Matsubayashi, Tatsuhiko, 4,712,523, Cl. 123-188.00M.
Kip, Ruloff F., Jr.: *See*—
Kimball, David B.; and Kip, Ruloff F., Jr., 4,713,564, Cl. 307-542.100.
Kipperman, Stuart R.: *See*—
Bruno, Robert; Kipperman, Stuart R.; Mayer, Geoffrey R.; and Thomas, Michael, 4,713,064, Cl. 604-257.000.
Kircher, Klaus: *See*—
Kress, Hans-Jurgen; and Kircher, Klaus, 4,713,462, Cl. 548-473.000.
Kirchhan, James J. Containerized shock mount. 4,712,685, Cl. 206-591.000.
Kirchhoff, Bernd; and Mecklenfeld, Hermann, to O&K Orenstein & Koppel Aktiengesellschaft. Apparatus for charging at least one top-loading crusher. 4,712,744, Cl. 241-80.000.
Kirkland, Robert N., to U.S. Philips Corporation. Method and apparatus for deriving frame interal signals. 4,713,692, Cl. 358-150.000.
Kirkpatrick, Edward S.: *See*—
Cooper, John F.; Kirkpatrick, Edward S.; and Linsker, Ralph, 4,713,773, Cl. 364-491.000.
Kirz, Karel: *See*—
Katchko, John; Kirz, Karel; and Plaisance, Thomas H., 4,713,410, Cl. 524-500.000.

Kisanuki, Shigeru: *See*—
Yoshida, Masaaki; Endo, Shigeki; Kisanuki, Shigeru; and Kakuzen, Hideo, 4,713,107, Cl. 65-157.000.

Kish, Karl E. Rafter angle measuring device. 4,712,307, Cl. 33-421.000.

Kishida, Akira: *See*—
Ohta, Norio; Yanagishima, Fumiya; Kaihara, Toshikazu; Kishida, Akira; Sato, Kuniaki; and Ochiai, Masanobu, 4,713,154, Cl. 204-145.00R.

Kishita, Eiji: *See*—
Sasaki, Makoto; Yoshida, Jun; Shimizu, Yoshishige; Akazawa, Kiyoshi; Kishita, Eiji; and Hirata, Kaoru, 4,713,291, Cl. 428-373.000.

Kitagawa Industries Co., Ltd.: *See*—
Fujimoto, Nobuaki, 4,712,939, Cl. 403-24.000.

Kitahara, Akira: *See*—
Akiyama, Shigeru; Ueno, Hidetoshi; Imagawa, Koji; Kitahara, Akira; Nagata, Sumio; Morimoto, Kazuo; Nishikawa, Tooru; and Itoh, Masao, 4,713,277, Cl. 428-131.000.

Kitamoto, Tatsuji: *See*—
Masaki, Kouichi; and Kitamoto, Tatsuji, 4,713,261, Cl. 427-129.000.

Kitaoka, Takashi, to Kabushiki Kaisha Ishida Koki Seisakusho. Label printer with variable format. 4,712,929, Cl. 400-76.000.

Kitaura, Eiji: *See*—
Yoda, Kuniichi; Kitaura, Eiji; Tsunoda, Tsutomu; and Kawakami, Yoshio, 4,713,278, Cl. 428-141.000.

Kitayoshi, Hitoshi: *See*—
Kasahara, Toshiharu; Ogami, Takayuki; and Kitayoshi, Hitoshi, 4,713,788, Cl. 364-718.000.

Kitazawa, Jitsuo: *See*—
Kokubo, Ichiro; Mizuta, Atsuo; Yamamoto, Yoshitaka; and Kitazawa, Jitsuo, 4,712,414, Cl. 72-366.000.

Kitoh, Makoto: *See*—
Kokaku, Yuuichi; Kitoh, Makoto; and Honda, Yoshinori, 4,713,288, Cl. 428-336.000.

Kjohl, Olav; Obrestad, Torstein; and Groland, Hans, to Norsk Hydro, a.s. NPK complex fertilizer. 4,713,108, Cl. 71-32.000.

Kjornaes, Kim; and Linnemann, Jorgen, to A/S Alfred Benzon. Diffusion coated multiple-units dosage form. 4,713,248, Cl. 424-468.000.

Klages, Claus-Peter: *See*—
Tolksdorf, Wolfgang F. M.; Bartels, Inske E. H.; Dammann, Hans O. B.; Klages, Claus-Peter; and Pross, Elke B., 4,712,855, Cl. 350-96.120.

Klatt, Alfred, to WABCO Westinghouse Fahrzeugbremsen GmbH. Transmission control apparatus and method for vehicle traveling uphill or downhill. 4,713,764, Cl. 364-424.100.

Klein, Douglas J.: *See*—
Klein, Paul E.; and Klein, Douglas J., 4,713,001, Cl. 433-18.000.

Klein, Herbert H., to Unarco Industries, Inc. Knockdown storage rack with wedge connectors. 4,712,696, Cl. 211-192.000.

Klein, Max, to Crane, Frederick G., Jr.; and Klein, Max, Trustee. High temperature filter material. 4,713,285, Cl. 428-283.000.

Klein, Max, Trustee: *See*—
Klein, Max, 4,713,285, Cl. 428-283.000.

Klein, Paul E.; and Klein, Douglas J. Orthodontic bracket-mounted traction hook. 4,713,001, Cl. 433-18.000.

Kleinewefers Textilmaschinen GmbH: *See*—
Meisen, Klaus; and Towes, Peter, 4,712,472, Cl. 100-37.000.

Kletscher, Barrie D.: *See*—
De Kelaita, Nergal R.; Hall, Joe T.; and Kletscher, Barrie D., 4,713,758, Cl. 364-200.000.

Klimov, Sergei B.: *See*—
Negrutsky, Sergei B.; Klimov, Sergei B.; Negrutsky, Boris F.; and Churkin, Vladimir G., 4,712,772, Cl. 254-264.000.

Klink, Winfred. Electrical contact making arrangement for monitoring the condition of a screw in an installed position. 4,713,506, Cl. 200-158.000.

Klinkel, Wolfgang, to ILAPAK Research & Development S.A. Tubular bag closing machine. 4,713,047, Cl. 493-34.000.

Klockner-Humboldt-Deutz AG: *See*—
Weber, Thomas, 4,712,371, Cl. 60-39.142.

Kloker, Kevin L.; and Cieslak, Ronald H., to Motorola, Inc. Exclusive OR/NOR gate having cross-coupled transistors. 4,713,790, Cl. 364-784.000.

Klovstad, John W.; Lee, Chin-Hui; and Ganesan, Kalyan, to Exxon Research and Engineering Company. Speech recognition method having noise immunity. 4,713,777, Cl. 364-513.500.

Knapp, Alan G.; Overall, Colin D.; and Slater, Richard A. M., to U.S. Philips Corporation. Method of making a color selection deflection structure, and a color picture display tube including a color selection deflection structure made by the method. 4,713,575, Cl. 313-400.000.

Knapp, Suzanne C.: *See*—
Agarwal, Arun K.; Knapp, Suzanne C.; and Lakness, David R., 4,713,754, Cl. 364-200.000.

Knauf, Suzanne, to University of Rochester, The. Monoclonal antibody directed to an antigen derived from human ovarian tumors and a radioimmunoassay using the antibody. 4,713,351, Cl. 436-542.000.

Knight, Eugene U., III: *See*—
Stocker, Elizabeth M.; and Knight, Eugene U., III, 4,713,008, Cl. 434-167.000.

Knowles, Carl H., to Metrologic Instruments, Inc. Compact omnidirectional laser scanner. 4,713,532, Cl. 235-467.000.

Knus, Jean A.: *See*—
Kunz, Rino E.; Junghaus, Jurgen R.; Knus, Jean A.; Murbach, Urs; and Tuor, Marcel F., 4,713,537, Cl. 250-227.000.

Koatsu Gas Kogyo Co., Ltd.: *See*—
Koga, Mitsuyuki; Hirai, Kenichiro; Sugimae, Toshio; and Fukushige, Setsuo, 4,713,405, Cl. 523-212.000.

Kobata, Hiroshi; and Kojima, Tadashi, to Kabushiki Kaisha Toshiba. Digital signal reproducing circuit. 4,713,802, Cl. 369-59.000.

Kobayashi, Nobuyuki; Hattori, Takashi; Yagi, Katsunori; and Ito, Toshimitsu, to Toyota Jidosha Kabushiki Kaisha. Method and apparatus for controlling air-fuel ratio in internal combustion engine. 4,713,766, Cl. 364-431.050.

Kobayashi, Toshiki: *See*—
Ishimaru, Hitoshi; and Kobayashi, Toshiki, 4,713,209, Cl. 376-211.000.

Kobler, Robert J., to AMP Incorporated. Sealed electrical connector and method of using same. 4,713,021, Cl. 439-272.000.

Koch, Alan A., to Alumax, Inc. Billet heating process. 4,712,413, Cl. 72-361.000.

Kocsis, Deborah L., to Dow Chemical Company, The. Method for controlling the flow of liquids through a subterranean formation. 4,712,617, Cl. 166-270.000.

Kodama, Hisashi; and Okabe, Yoshio, to Aisin Seiki Kabushiki Kaisha; and Toyota Jidosha Kabushiki Kaisha. Auto-tensioner for belt systems and a method for adjusting tension degree. 4,713,045, Cl. 474-135.000.

Kodera, Tamotsu: *See*—
Uno, Kunihiko; Tamade, Yoshinori; Horino, Seiya; and Kodera, Tamotsu, 4,712,741, Cl. 241-16.000.

Koga, Mitsuyuki; Hirai, Kenichiro; Sugimae, Toshio; and Fukushige, Setsuo, to Koatsu Gas Kogyo Co., Ltd. α-cyanoacrylate adhesive composition of matter. 4,713,405, Cl. 523-212.000.

Kogure, Hiroshi: *See*—
Hibino, Yo..hitaka; and Kogure, Hiroshi, 4,712,452, Cl. 74-866.000.

Kohguchi, Takuma: *See*—
Haruguchi, Kenji; Kohguchi, Takuma; and Sekiya, Osamu, 4,712,499, Cl. 114-77.00R.

Kohne, Bernd: *See*—
Praefcke, Klaus; Kohne, Bernd; Poetsch, Eike; and Herz, Claus P., 4,713,196, Cl. 252-299.010.

Koizumi, Toru: *See*—
Takeuchi, Yoshio; Koizumi, Toru; and Hori, Kozo, 4,713,469, Cl. 560-17.000.

Kojima, Tadashi: *See*—
Kobata, Hiroshi; and Kojima, Tadashi, 4,713,802, Cl. 369-59.000.

Kojima, Takao; and Ishiguro, Hiroyuki, to NGK Spark Plug Co., Ltd. Pump cell element for air-fuel ratio sensor. 4,713,166, Cl. 204-425.000.

Kokaku, Yuuichi; Kitoh, Makoto; and Honda, Yoshinori, to Hitachi, Ltd. Magnetic recording medium. 4,713,288, Cl. 428-336.000.

Kokubo, Ichiro; Mizuta, Atsuo; Yamamoto, Yoshitaka; and Kitazawa, Jitsuo, to Kabushiki Kaisha Kobe Seiko Sho. Rolling method of plate-like stock material by edger, and continuous hot rolling mill. 4,712,414, Cl. 72-366.000.

Koller, David R.: *See*—
Udell, Theodore H.; and Koller, David R., 4,713,207, Cl. 264-515.000.

Komaki, Toshiro, to Tachikawa Corporation. Shutter. 4,712,599, Cl. 160-133.000.

Komatsu, Michiyasu, to Tokyo Shibaura Denki Kabushiki Kaisha. Sintered ceramic body. 4,713,302, Cl. 428-698.000.

Komatsu, Mikio: *See*—
Makimoto, Toshio; Nishimura, Sadahiko; Matsuo, Masayuki; Abiko, Toshio; Ishizaki, Hirohumi; Kanda, Minoru; Nunoya, Hidetsugu; and Komatsu, Mikio, 4,713,670, Cl. 343-700.0MS.

Komis, Glenna. External male urinary catheter with garment. 4,713,066, Cl. 604-353.000.

Kondo, Ikuzo: *See*—
Nomura, Etuzo; Sakakibara, Yasuo; Kozawa, Tetsuo; Nishida, Yukio; and Kondo, Ikuzo, 4,712,497, Cl. 112-315.000.

Kondo, Kenshi, to Nihon Den-Netsu Keiki Co. Ltd. Apparatus for soldering printed circuit boards. 4,712,963, Cl. 414-222.000.

Kondo, Mitsuru: *See*—
Omatsu, Masayuki; Yonese, Naoki; and Kondo, Mitsuru, 4,713,488, Cl. 564-397.000.

Kongslie, Keith F.: *See*—
Van Nice, H. Lee; Bostwick, Myron A., Jr.; and Kongslie, Keith F., 4,713,520, Cl. 219-121.0LC.

Konig, Dieter: *See*—
Stamm, Wolfgang; and Konig, Dieter, 4,712,289, Cl. 29-568.000.

Konishiroku Photo Industry Co., Ltd.: *See*—
Asano, Masao; Isobe, Ryosuke; Yamauchi, Yasuhisa; and Yamagishi, Hiroaki, 4,713,293, Cl. 428-403.000.
Nakamura, Shinichi; and Ohbayashi, Keiji, 4,713,317, Cl. 430-551.000.

Konrad, Eugen; and Clausen, Thomas, to Wella Aktiengesellschaft. Method and composition for the dyeing of hair with 2,6-diaminopyridine derivatives. 4,713,080, Cl. 8-408.000.

Koot, Hubertus H. M., to Mandhy Products B.V. Cuyk. Urine-receiving system. 4,713,065, Cl. 604-329.000.

Koppel, Caralee P.: *See*—
Antonelli, Douglas C.; Branscomb, Patricia M.; Broockman, Eric C.; Dickson, LeRoy D.; Koppel, Caralee P.; Ossowski, Richard; and Stokes, Olen L., Jr., 4,713,785, Cl. 364-569.000.

Kopperschmidt-Muller GmbH & Co. KG: *See*—
Luttermoller, Jurgen, 4,713,257, Cl. 427-27.000.

Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., to Du Pont de Nemours, E. I., and Company. Chip resistant primer composition V" . 4,713,425, Cl. 525-438.000.

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Arutjunian, Norair S.; Kornena, Elena P.; Kazarian, Robert V.; Ponomareva, Natalya A.; Redko, Grigory V.; Sakhno, Lidia T.; and Zhidkova, Irina S., 4,713,155, Cl. 204-155.000.

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Fujishima, Shizu; Yaku, Fumiko; and Koshijima, Tetsuo, 4,713,334, Cl. 435-99.000.

Kostecki, John A.: *See*—
Earhart, Jonathan P.; Kostecki, John A.; and McNutt, Adrian C., 4,713,119, Cl. 134-3.000.

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Arold, Klaus; Grimm, Hermann, deceased; and Koukal, Heinz, 4,712,608, Cl. 165-41.000.

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Morishita, Akira; Okamoto, Kyoichi; Nakagawa, Taiichi; Morikane, Hiroyuki; Hasegawa, Akinori; Arima, Takemi; and Kounou, Tadami, 4,712,451, Cl. 74-801.000.

Kovalchek, John G., to Fore-Sight Golf, Inc. Golf putter with sighting device. 4,712,797, Cl. 273-163.00R.

Kowsh, Inc.: *See*—
Eastep, Calvin W., 4,713,525, Cl. 219-308.000.

Kozakae, Kunitoshi: *See*—
Takamiya, Kikuzo; Ishibashi, Hideyuki; and Kozakae, Kunitoshi, 4,712,450, Cl. 74-750.00B.

Kozawa, Tetsuo: *See*—
Nomura, Etuzo; Sakakibara, Yasuo; Kozawa, Tetsuo; Nishida, Yukio; and Kondo, Ikuzo, 4,712,497, Cl. 112-315.000.

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Nakamura, Kozoo; Kozima, Yasuyuki; Hamada, Nagaharu; and Sakata, Kunihiro, 4,713,699, Cl. 358-296.000.

Kraemer, Hans P.: *See*—
Aretz, Werner; Berscheid, Hans G.; Huber, Gerhard; Fehlhaber, Hans-Wolfram; Kraemer, Hans P.; Sedlacek, Hans-Harald; Ganguli, Bimal N.; Sood, Ratan S.; Gandhi, Julia; and Reddy, Gaukapalli C., 4,713,371, Cl. 514-34.000.

Kraft, Josef: *See*—
Heinrich, Hansjorg; and Kraft, Josef, 4,712,481, Cl. 102-435.000.

Kraftelektronik AB: *See*—
Hansson, Curt, 4,713,093, Cl. 55-139.000.

Krall, Robert E., to CRX Medical, Inc. Radiopaque cyanoacrylates. 4,713,235, Cl. 424-5.000.

Kramer, Hermann: *See*—
Harder, Hans E.; and Kramer, Hermann, 4,712,541, Cl. 128-92.0YY.

Kramer, Josef; Irmscher, Klaus; Prucher, Helmut; and Hesch, Rolf-Dieter, to Merck Patent Gesellschaft mit beschrankter Haftung. Flavanone intermediates for halogenohydroxyflavones. 4,713,465, Cl. 549-403.000.

Kramer, Wolfgang; Weissmuller, Joachim; Reiser, Wolf; Berg, Dieter; Brandes, Wilhelm; and Reinecke, Paul, to Bayer Aktiengesellschaft. Fungicidal agents. 4,713,379, Cl. 514-212.000.

Krapf, Charles W.: *See*—
Harrington, Richard H.; and Krapf, Charles W., 4,712,627, Cl. 177-50.000.

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Arutjunian, Norair S.; Kornena, Elena P.; Kazarian, Robert V.; Ponomareva, Natalya A.; Redko, Grigory V.; Sakhno, Lidia T.; and Zhidkova, Irina S., 4,713,155, Cl. 204-155.000.

Krasser, Wolfgang: *See*—
Woike, Theo; Krasser, Wolfgang; and Haussuhl, Siegfried, 4,713,795, Cl. 365-119.000.

Kraus, Ronald G.: *See*—
Bremer, James C.; Hurt, Fred S.; Romanski, John G.; Kroupa, Richard F.; and Kraus, Ronald G., 4,713,533, Cl. 250-203.00R.

Krause, Joachim: *See*—
Eidenschink, Rudolf; Krause, Joachim; Hittich, Reinhard; Poetsch, Eike; Scheuble, Bernhard; Weber, Georg; and Pohl, Ludwig, 4,713,197, Cl. 252-299.610.

Krause, John T.; Kurkjian, Charles R.; and Paek, Un-Chul, to American Telephone and Telegraph Company, AT&T Bell Laboratories. Method for glass fiber splicing by flame fusion. 4,713,105, Cl. 65-4.100.

Krauss-Maffei A.G.: *See*—
Hesse, Hans, 4,712,469, Cl. 91-422.000.

Kremp, Jurgen: *See*—
Muller, Dietmar; and Kremp, Jurgen, 4,713,127, Cl. 149-98.000.

Kress, Hans-Jurgen; and Kircher, Klaus, to Bayer Aktiengesellschaft. Flameproofing agents, their preparation and their use for providing polycarbonates with a flame-resistant finish. 4,713,462, Cl. 548-473.000.

Kress, Willy. Drilling and percussion hammer. 4,712,625, Cl. 173-104.000.

Krietemeier, Rickie F.; and Ross, Laurence W., to Confidence Corporation. Apparatus for analyzing malodors in the breath. 4,713,164, Cl. 204-400.000.

Krinski, Thomas L.; and Steinmetz, Alan L., to Ralston Purina Company. Protein modified with a silanation reagent as an adhesive binder and process of producing. 4,713,116, Cl. 106-154.100.

Kristen, Ulrich; Haring , Ulrich; Fischer, Francis; and Cron, Alain, to Lonza Ltd.; and Ciba-Geigy A.G. Lubricant additive in powder to paste form. 4,713,186, Cl. 252-30.000.

Kroll, Menahem. Defensive system for use against hostile elements. 4,713,725, Cl. 361-232.000.

Krounbi, Mohamad T.; and Voegeli, Otto, to International Business Machines. Magnetoresistive read transducer. 4,713,708, Cl. 360-113.000.

Kroupa, Richard F.: *See*—
Bremer, James C.; Hurt, Fred S.; Romanski, John G.; Kroupa, Richard F.; and Kraus, Ronald G., 4,713,533, Cl. 250-203.00R.

Krumme, John F., to Beta Phase, Inc. Intravenous tube and controller therefor. 4,713,063, Cl. 604-250.000.

Krusche, Peter, to Hergeth Hollingsworth GmbH. Carding roller for processing staple fibers. 4,712,276, Cl. 19-99.000.

Kubicki, Philip; and Richardson, Geoffrey. Bridge and tuning mechanism for stringed instruments. 4,712,463, Cl. 84-304.000.

Kubo, Masahiro: *See*—
Hamajima, Kaneo; Dohnomoto, Tadashi; Tanaka, Atsuo; and Kubo, Masahiro, 4,712,600, Cl. 164-97.000.

Kubodera, Seiiti; Ukai, Toshinao; and Okada, Hisashi, to Fuji Photo Film Co., Ltd. Heat-developable photographic materials. 4,713,316, Cl. 430-351.000.

Kubota Ltd.: *See*—
Sugahara, Kooichi; Shinno, Yoshio; and Kimoto, Kiyoharu, 4,712,519, Cl. 123-52.00M.

Kuck, Mark A.: *See*—
Michel, Christian G.; Schachter, Rozalie; Kuck, Mark A.; Baumann, John A.; and Raccah, Paul M., 4,713,192, Cl. 252-62.30R.

Kudert, Frederick G.; Latreille, Maurice G.; McHenry, Robert J.; Nahill, George F.; Pfutzenreuter, Henry, III; Tennant, William A.; Tung, Thomas T.; and Vella, John, Jr., to American Can Company. Apparatus for injection molding and injection blow molding multilayer articles. 4,712,990, Cl. 425-130.000.

Kugelman, Michael M., to B. F. Goodrich Company, The. Fast acting overcurrent protector and method. 4,713,719, Cl. 361-54.000.

Kuhl, Henry Y. Apparatus for movably washing, rinsing and drying a stationary article. 4,712,573, Cl. 134-95.000.

Kuhle, Engelbert: *See*—
Salzburg, Herbert; Hajek, Manfred; Hagemann, Hermann; Kuhle, Engelbert; Fuhrer, Wolfgang; Hansaler, Gerd; Brandes, Wilhelm; and Reinecke, Paul, 4,713,389, Cl. 514-373.000.

Kuhlman, Michael J.: *See*—
Layman, Frederick P.; and Kuhlman, Michael J., 4,713,551, Cl. 250-561.000.

Kuhn, Michael A.: *See*—
Mackiewicz, Ralph E.; and Kuhn, Michael A., 4,713,756, Cl. 364-200.000.

Kunikawa, Norihide: *See*—
Anzai, Shunju; Sasaki, Hiromu; Kunikawa, Norihide; and Ohgita, Kazuyuki, 4,713,550, Cl. 250-560.000.

Kunkle, Timothy E.: *See*—
Herr, Leroy E.; Shea, Allan K.; and Kunkle, Timothy E., 4,712,768, Cl. 251-305.000.

Kunz, Rino E.; Junghaus, Jurgen R.; Knus, Jean A.; Murbach, Urs; and Tuor, Marcel F., to Gretag Aktiengesellschaft. Method and apparatus for the fine position adjustment of a laser beam. 4,713,537, Cl. 250-227.000.

Kuraray Co., Ltd.: *See*—
Aoyama, Akimasa; Moritani, Takeshi; Yonezu, Kiyoshi; Negi, Taichi; and Okaya, Takuji, 4,713,296, Cl. 428-412.000.

Kurashige, Mitsuhiro: *See*—
Takayama, Shigehiko; Suzuki, Hitomi; Maruyama, Masanori; Fukushima, Masakazu; and Kurashige, Mitsuhiro, 4,713,588, Cl. 315-382.000.

Kurihara, Yoichi: *See*—
Aikou, Kenichi; Kurihara, Yoichi; and Goto, Tsugio, 4,712,477, Cl. 102-206.000.

Kurkjian, Charles R.: *See*—
Krause, John T.; Kurkjian, Charles R.; and Paek, Un-Chul, 4,713,105, Cl. 65-4.100.

Kurland, Kenneth Z. Method for the repair of connective tissue. 4,713,075, Cl. 623-13.000.

Kuroda, Toshihisa: *See*—
Nishimura, Shigeru; and Kuroda, Toshihisa, 4,713,685, Cl. 358-103.000.

Kuroiwa, Akihiko: *See*—
Namba, Kenryo; Asami, Shigeru; Aoi, Toshiki; Takahashi, Kazuo; and Kuroiwa, Akihiko, 4,713,314, Cl. 430-270.000.

Kurosaki, Tomihiro: *See*—
Sekine, Fumimaro; Kurosaki, Tomihiro; Ukena, Toshinao; and Kamitani, Hiroshi, 4,713,487, Cl. 562-587.000.

Kurosawa, Ryuichi, to Toyota Jidosha Kabushiki Kaisha. Vehicle active suspension system incorporating acceleration detecting means. 4,712,807, Cl. 280-707.000.

Kurosawa, Tomoe: *See*—
Ohno, Yasunori; Kurosawa, Tomoe; Sato, Tadashi; Kurosawa, Yukio; and Hakamata, Yoshimi, 4,713,585, Cl. 315-111.810.

Kurosawa, Yukio: *See*—
Ohno, Yasunori; Kurosawa, Tomoe; Sato, Tadashi; Kurosawa, Yukio; and Hakamata, Yoshimi, 4,713,585, Cl. 315-111.810.

Kusumgar, Rajal M., to Celanese Corporation. Polyoxymethylene molding compositions exhibiting improved toughness. 4,713,414, Cl. 525-64.000.

Kuthi, Csaba: *See*—
Ezer, Elemer; Harsanyi, Kalman; Petho, Hajnalka V.; Matuz, Judit; Szporny, Laszlo; Cholnoky, Eszter; Kuthi, Csaba; Trischler, Ferenc; Hegedus, Bela; Kapolnas, Marta; and Kallay, Anna, 4,713,388, Cl. 514-346.000.

Kutscha, Herbert A.: *See*—
Graciotti, Alessandro; and Kutscha, Herbert A., 4,713,779, Cl. 364-521.000.

Kuwabara, Takashi: *See*—
Ogawa, Takayuki; Ito, Hideaki; Kimura, Naokazu; Ito, Hayami; Tatsumi, Shuhei; Takao, Shoichi; Suzuki, Nitaro; Watanabe, Takashi; Shinano, Kunizo; Kuwabara, Takashi; and Aoki, Kaoru, 4,712,742, Cl. 241-20.000.

Kuwahara, Kazuyoshi; Fukushima, Isao; Miura, Kuniaki; and Kano, Kenji, to Hitachi, Ltd. A recording circuit having means to automatically set the recording current of a magnetic recording head. 4,713,700, Cl. 358-315.000.

Kuwahara, Shinichi: *See*—
Suzuki, Takahisa; Kuwahara, Shinichi; and Kawashima, Yoshinori, 4,712,633, Cl. 180-149.000.

Kuznicki, Steven M.: *See*—
Maroulis, Peter J.; Coe, Charles G.; Kuznicki, Steven M.; Clark, Patrick J.; and Roberts, David A., 4,713,362, Cl. 502-85.000.

Kuzuya, Fumio; and Endo, Hidetoshi, to Toyama Chemical Co., Ltd. Dementia-improving and therapeutic agents. 4,713,376, Cl. 514-78.000.

Kwon, Young D.; Kavesh, Sheldon; and Prevorsek, Dusan C., to Allied Corporation. High strength and modulus polyvinyl alcohol fibers and method of their preparation. 4,713,290, Cl. 428-364.000.

Kyllmann, Clemens A.: *See*—
Chun, Kil Whan; and Kyllmann, Clemens A., 4,713,079, Cl. 8-101.000.

L. Schuler GmbH: *See*—
Roos, Gerhard; Dexling, Hartmut; and Michael, Wolfgang, 4,712,412, Cl. 72-345.000.

Labavia S.G.E.: *See*—
Courtois, Jean-Claude, 4,712,656, Cl. 188-218.0XL.

Laboratoire Central Des Ponts Et Chaussees: *See*—
Siffert, Marcel; Briant, Gervais; Feunten, Pierre; Goacolou, Honore ; Petitgrand, Jean-Claude; and Peyret, Francois, 4,712,423, Cl. 73-146.000.

LaDue, Philip G.; and Peglow, James D., to Standard Register Company, The. Blank document guard in a check writing machine. 4,712,935, Cl. 400-645.100.

Laeis-Werke AG: *See*—
Jung, Rolf, 4,713,204, Cl. 264-120.000.

Lafon, Louis, to Societe Anonyme Dite: Laboratoire L. LaFon. Acetohydroxamic acid derivative. 4,713,395, Cl. 514-575.000.

Lai, Shui T.: *See*—
Gualtieri, Devlin M.; and Lai, Shui T., 4,713,577, Cl. 313-468.000.

Lair, John E.; Luckenbill, Lawrence F.; and Holliday, Richard J., to A. W. Cash Valve Manufacturing Corporation. Self-draining hose connection vacuum breaker and backflow preventer. 4,712,575, Cl. 137-218.000.

L'Air Liquide: *See*—
Madsac, Michel, 4,713,215, Cl. 419-8.000.

Lakness, David R.: *See*—
Agarwal, Arun K.; Knapp, Suzanne C.; and Lakness, David R., 4,713,754, Cl. 364-200.000.

Lalikos, James M.; and Waite, Harold K., to Titeflex Corporation. Self-damping convoluted conduit. 4,712,642, Cl. 181-207.000.

Lambert, Herbert L., to Waldorf Corporation. Double breakapart carton with sealable ends and blank for forming the same. 4,712,688, Cl. 206-602.000.

Lambert, Jean-Pierre: *See*—
Charbrol, Jean-Jacques; and Lambert, Jean-Pierre, 4,712,830, Cl. 297-42.000.

Lambert, Maurice, to Service National: Gaz de France. System for applied current cathodic protection of a structure. 4,713,158, Cl. 204-196.000.

Lancaster, Patrick R.; and Lancaster, William G., to Lantech, Inc. Dual rotating stretch wrapping apparatus and process. 4,712,354, Cl. 53-399.000.

Lancaster, Patrick R.; and Lancaster, William G., to Lantech, Inc. Power assisted roller-stretch apparatus and process. 4,712,686, Cl. 206-597.000.

Lancaster, William G.: *See*—
Lancaster, Patrick R.; and Lancaster, William G., 4,712,354, Cl. 53-399.000.
Lancaster, Patrick R.; and Lancaster, William G., 4,712,686, Cl. 206-597.000.

Landgraf, Gunter: *See*—
Wild, Wolfgang; Straub, Joachim; and Landgraf, Gunter, 4,713,512, Cl. 219-10.55E.

Langerbeins, Klaus; Schroder, Gunther; and Boehm, Hans-Peter, to Rohm GmbH Chemische Fabrik. Process for the production of oxalic acid diesters. 4,713,483, Cl. 560-204.000.

Langner, Carl, to SMS Concast Inc. Oscillator for a continuous casting mold. 4,712,447, Cl. 74-571.00R.

Langon, Bernard: *See*—
Chaffy, Joseph; Langon, Bernard; and Leroy, Michel, 4,713,161, Cl. 204-243.00M.

Lansen, Jacqueline: *See*—
Bayol, Alain; Blanc, Francis; Lansen, Jacqueline; Maffrand, Jean-Pierre; and Pereillo, Jean-Marie, 4,713,373, Cl. 514-54.000.

Lantech, Inc.: *See*—
Lancaster, Patrick R.; and Lancaster, William G., 4,712,354, Cl. 53-399.000.
Lancaster, Patrick R.; and Lancaster, William G., 4,712,686, Cl. 206-597.000.

Lantero, Oreste J., Jr.: *See*—
Chiang, John P.; and Lantero, Oreste J., Jr., 4,713,333, Cl. 435-96.000.

Lanxide Technology Company, LP: *See*—
Newkirk, Marc S.; and Dizio, Steven F., 4,713,360, Cl. 501-87.000.

Lanzer, Heribert, to Steyr-Daimler-Puch AG. Drive mechanism for motor vehicles having two drive axles. 4,712,448, Cl. 74-665.0GC.

Laroche, Pierre, to Glaverbel. Method of modifying the wettability of glass beads, glass beads polymeric material incorporating such glass beads, and method of applying reflective markings to a surface. 4,713,295, Cl. 428-406.000.

Larson, Donald A., to North States Industries, Inc. Multiple panel play area. 4,712,773, Cl. 256-25.000.

Lasker, Martin L.; and Cohen, Joel S., to Prescolite Inc. Electrical lighting fixture with multiple rotation mechanism. 4,713,737, Cl. 362-285.000.

Lassmann, Manfred, to W. Schlafhorst & Co. Method and device for forming a thread joint. 4,712,367, Cl. 57-263.000.

Latham, Phillip A. Freeboard measuring device. 4,712,305, Cl. 33-126.500.

Latreille, Maurice G.: *See*—
Kudert, Frederick G.; Latreille, Maurice G.; McHenry, Robert J.; Nahill, George F.; Pfutzenreuter, Henry, III; Tennant, William A.; Tung, Thomas T.; and Vella, John, Jr., 4,712,990, Cl. 425-130.000.

Latszereszeti Eszkozok Gyara: *See*—
Janos, Antal; and Jeno, Pojbics, 4,712,822, Cl. 296-24.00R.

Lauffer, Donald K.; Milby, Gregory H.; Rostek, Paul M.; and Sanwo, Ikuo J., to NCR Corporation. Terminator for a cmos transceiver device. 4,713,827, Cl. 375-7.000.

Lausmaa, Jukka: *See*—
Branemark, Per-Ingvar; Kasemo, Bengt; and Lausmaa, Jukka, 4,712,681, Cl. 206-438.000.

Lauterbach, Horst: *See*—
Mulhaupt, Rolf; Renner, Alfred; and Lauterbach, Horst, 4,713,428, Cl. 525-523.000.

Lavengood, Richard E.; Padwa, Allen R.; and Harris, Alva F., to Monsanto Company. Rubber modified nylon composition. 4,713,415, Cl. 525-66.000.

Laviron, Andre , to Commissariat a l'Energie Atomique. System for testing the failure or satisfactory operation of a circuit having logic components. 4,713,606, Cl. 324-73.00R.

Law, Kock-Yee; and Wescott, James M., to Xerox Corporation. Organic azo photoconductor imaging members. 4,713,307, Cl. 430-57.000.

Layman, Frederick P.; and Kuhlman, Michael J., to Varian Associates, Inc. System for measuring the position of a wafer in a cassette. 4,713,551, Cl. 250-561.000.

Leanza, William J.; and Wildonger, Kenneth J., to Merck & Co., Inc. Crystalline dimethyliminothienamycin. 4,713,451, Cl. 540-350.000.

Lear Siegler, Inc.: *See*—
Pareja, Ramon, 4,712,584, Cl. 138-30.000.

Lebedev, Vladimir K.; Chernenko, Ivan A.; Dyshlenko, Alexandr T.; Litvin, Leonid V.; and Tishura, Vladimir I. Method of friction welding. 4,712,724, Cl. 228-112.000.

LeClear, Douglas D., to Whirlpool Corporation. Dehumidifier having low profile receptacle. 4,712,382, Cl. 62-150.000.

Lederman, Frederick E.; and King, Donald J., to General Motors Corporation. Overrunning clutch cage. 4,712,661, Cl. 192-45.000.

Lee, Chin-Hui: *See*—
Klovstad, John W.; Lee, Chin-Hui; and Ganesan, Kalyan, 4,713,777, Cl. 364-513.500.

Lee, Chun-Sheu, to Amada Engineering & Service Co., Inc. Optical bistable device. 4,713,818, Cl. 372-8.000.

Lee, Chun-Sheu, to Amada Engineering & Service Co., Inc. Laser device. 4,713,822, Cl. 372-69.000.

Lee, Eddie C.: *See*—
Erie, David G.; Roberts, Jon A.; and Lee, Eddie C., 4,713,682, Cl. 357-54.000.

Lee, George M., to Hughes Aircraft Company. Method of forming a helical wave guide assembly by precision coining. 4,712,294, Cl. 29-600.000.

Lee, Gil S.: *See*—
Iyer, Venkatraman; and Lee, Gil S., 4,713,605, Cl. 324-73.00R.

Lee, Hans. Method and apparatus for performing suction lipectomy. 4,713,053, Cl. 604-49.000.

Lee, James C., to Honeywell Inc. $NO_2$ thin film electro-optic switch. 4,712,857, Cl. 350-96.140.

Lee, Kang W.: *See*—
Vu, Tho T.; and Lee, Kang W., 4,713,559, Cl. 307-446.000.

Lee, Robert D., to Dallas Semiconductor Corporation. Battery charging protection circuit. 4,713,555, Cl. 307-66.000.

Lee, Rodney E.: *See*—
Jones, Robert E., Jr.; Lee, Rodney E.; and Yeh, Tsu-Hsing, 4,713,711, Cl. 360-123.000.

Lee, Sae D.; and Palac, Kazimir, to Zenith Electronics Corporation. Means and method for manufacture of a high-resolution color cathode ray tube. 4,713,034, Cl. 445-45.000.

Legerius, Bengt E.; and Sundstrom, Inge, to Thorsman & Co. Aktiebolag. Fire-sealed lead-through for framed building components. 4,712,342, Cl. 52-221.000.

Legris, Andre , to Societe Anonyme Styled Legris. Method and device for assembling several components, particularly connection fittings for fluid couplings. 4,712,809, Cl. 285-21.000.
Lehigh University: *See—*
Kim, Yong W.; and Harding, Thomas W., 4,713,548, Cl. 250-423.00R.
Leigh-Monstevens, Keith V.; and Mienko, David K., to Automotive Products plc. Hydraulic remote control for motor vehicle manual shift transmission. 4,712,640, Cl. 180-336.000.
Leine & Konig: *See—*
Schrimpf, Christian, 4,712,945, Cl. 405-132.000.
Leite, Peter G., to P.G.L. Industries, Inc. Security device for office machines. 4,712,763, Cl. 248-553.000.
Leith, William C. Rotating disc wood chip refiner. 4,712,745, Cl. 241-261.300.
Lemmer, Helmut; and Risthaus, Josef, to Square D Starkstrom GmbH. Circuit-breaker. 4,713,636, Cl. 335-35.000.
Leo, Vincent B.; Cyll, Kenneth M.; and Ide, Mason G., to GTE Products Corporation. PTC fuel heater for heating alcohol fuel. 4,713,524, Cl. 219-307.000.
Leone, David A.: *See—*
Maier, Alfred E.; Leone, David A.; and Ricci, Louis N., 4,713,637, Cl. 335-76.000.
Le Parquier, Guy: *See—*
Drabowitch, Serge; Baril, Michel; and Le Parquier, Guy, 4,713,663, Cl. 342-70.000.
Lepert, Claude, to Etablissements Pompes Guinard. Process and apparatus for circulating fluids by pumping. 4,712,984, Cl. 417-391.000.
Leroy, Michel: *See—*
Chaffy, Joseph; Langon, Bernard; and Leroy, Michel, 4,713,161, Cl. 204-243.00M.
Leshchiner, Adelya: *See—*
Balazs, Endre A.; Leshchiner, Adolf; Leshchiner, Adelya; and Band, Philip, 4,713,448, Cl. 536-55.100.
Leshchiner, Adolf: *See—*
Balazs, Endre A.; Leshchiner, Adolf; Leshchiner, Adelya; and Band, Philip, 4,713,448, Cl. 536-55.100.
Lester, James N.: *See—*
Byszewski, Wojciech W.; Fallier, Charles N., Jr.; and Lester, James N., 4,713,587, Cl. 315-289.000.
Letsche, Ulrich: *See—*
Rapp, Wolfgang, deceased; Hafner, Gunther; and Letsche, Ulrich, 4,712,530, Cl. 123-502.000.
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Levavasseur, Jean R., to Axytel. Process for marking and/or destroying valuable documents in particular and device for making use of it. 4,712,489, Cl. 109-25.000.
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Chun, Kil Whan; and Kyllmann, Clemens A., 4,713,079, Cl. 8-101.000.
Ho, Tan T., 4,713,193, Cl. 252-91.000.
Levin, Andrew E., to Wisconsin Alumni Research Foundation. Templet for simultaneous screening of several antibodies and method of using the same. 4,713,349, Cl. 436-515.000.
Levine, Marc M.: *See—*
Huttner, James; and Levine, Marc M., 4,713,057, Cl. 604-164.000.
Levinson, Arthur D.; and Simonsen, Christian C., to Genentech, Inc. Polycistronic expression vector construction. 4,713,339, Cl. 435-240.200.
Lewis, Lindon L., to Ball Corporation. Levered optical mount. 4,712,444, Cl. 74-479.000.
Lewis, Robert D.: *See—*
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Li, Felipe S., to Kendall Company, The. Method for making a sponge collecting device. 4,713,136, Cl. 156-229.000.
Liang, Victor: *See—*
Fang, Robert; Wang, Jerry; Liang, Victor; Farb, Joseph; and Hsu, Chung, 4,713,329, Cl. 437-29.000.
Libbey-Owens-Ford Co.: *See—*
Johnston, Norman W., 4,712,287, Cl. 29-469.000.
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Liberty Gifts, Inc.: *See—*
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Forster, Rudolf; Weber, Suso; and Pyka, Hans-Jurgen, 4,713,353, Cl. 437-2.000.
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Lichter, Robert J. Safe. 4,712,490, Cl. 109-69.000.
Liedle, William O. Adjustable reusable adapter system for temporary electric service. 4,712,762, Cl. 248-533.000.
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Franklin, Duane R.; Evans, Archibald D.; and Hansen, Walter J., 4,712,653, Cl. 187-18.000.
Lightstone, Alexander W., to RCA Corporation. Optical fiber connector and method of assembling same. 4,712,862, Cl. 350-96.210.
Lim, Jack S.; and Jones, Darrell L., to Vetco Gray Inc. Upper marine riser package. 4,712,620, Cl. 166-355.000.
Lin, Lawrence H.: *See—*
Fusek, Richard L.; and Lin, Lawrence H., 4,712,851, Cl. 350-3.600.
Lindemann, Klaus, to Wabco Westinghouse Fahrzeugbremsen GmbH. Control system for a motor vehicle engine to prevent slipping of the vehicle drive wheels during acceleration. 4,712,634, Cl. 180-197.000.
Lindemans, Willem; and Aaltonen, Lauri J., to Freeze Control Pty. Ltd. Cryosystem for biological material. 4,712,607, Cl. 165-30.000.
Lindsey Completion Systems: *See—*
Allwin, Roger P.; and Budke, Mark P., 4,712,614, Cl. 166-208.000.
Dockins, Roy R., Jr.; and Lindsey, Hiram E., Jr., 4,712,615, Cl. 166-208.000.
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Dockins, Roy R., Jr.; and Lindsey, Hiram E., Jr., 4,712,615, Cl. 166-208.000.
Lindsey, James N., to Avondale Mills. Textile and method of manufacture. 4,712,290, Cl. 28-178.000.
Lindstadt, Klaus; Halssig, Andreas; Maier, Dietmar; and Scholz, Stefan, to Diehl GmbH & Co. Re-securable mine. 4,712,480, Cl. 102-427.000.
Lindstrom, Richard L.; and Skelnik, Debra L. Viscoelastic solution. 4,713,375, Cl. 514-57.000.
Link, Erich: *See—*
Erndt, Hans; Link, Erich; Martin, Adolf; Palloch, Herbert; and Wittler, Hilmar, 4,712,660, Cl. 192-18.00B.
Link, William T., to Baxter Travenol Laboratories, Inc. Method of and apparatus for determining the diastolic and systolic blood pressure of a patient. 4,712,563, Cl. 128-681.000.
Linkow, Leonard I.; and Rinaldi, Anthony W., to Vent Plant Corporation. Submergible screw-type dental implant and method of utilization. 4,713,004, Cl. 433-174.000.
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Litton Systems, Inc.: *See—*
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Sparling, Kenneth P.; Incardona, Angelo; Kikendall, Garth D.; Richardson, David G.; Wood, Ronald E.; and Bakow, Leon, 4,712,958, Cl. 411-506.000.
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Mercado, Romeo I., 4,712,886, Cl. 350-482.000.
Lockheed Missles & Space Company, Inc.: *See—*
Bareket, Noah, 4,712,913, Cl. 356-121.000.
Lodetti, Attilio; and Blaser, Hansueli, to AG fur industrielle Elektronik AGIE Losone b. Locarno. Spark eroder with fixed machine table and lowerable working container for the dielectric. 4,712,288, Cl. 29-557.000.
Loewen, Heinz; and Wenko, Wold, to Electronic Plating Service, Inc. Process for producing electrical contacts for facilitating mass mounting to a contact holder. 4,712,299, Cl. 29-882.000.
Lofton, Hugh P., to Huck Manufacturing Company. Tumbling media. 4,712,333, Cl. 51-164.500.
Logicar A/S: *See—*
Jensen, Jakob, 4,712,827, Cl. 296-99.00R.
Login, Robert B.: *See—*
Chaudhuri, Ratan K.; Login, Robert B.; and Tracy, David J., 4,713,463, Cl. 548-517.000.
Logothetis, Anestis L.; and Stewart, Charles W., to Du Pont de Nemours, E. I., and Company. Blends of fluoroplastics and fluoroelastomers. 4,713,418, Cl. 525-200.000.
Lohmann, Arthur M.: *See—*
Haglund, Steve A.; Lohmann, Arthur M.; and Pickering-Johnson, Sharon A., 4,712,478, Cl. 102-424.000.
Lonati, Francesco, to Lonati SpA. Circular knitting machine incorporating a stitch density adjuster device. 4,712,390, Cl. 66-54.000.
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Lonati, Francesco, 4,712,390, Cl. 66-54.000.
Long, Margaret N.: *See—*
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Lonza Ltd.: *See*—
Kristen, Ulrich; Haring , Ulrich; Fischer, Francis; and Cron, Alain, 4,713,186, Cl. 252-30.000.
Looney, John H., to Xerox Corporation. Copy sheet offsetting device. 4,712,786, Cl. 271-207.000.
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Marshall, Howard B.; Kaye, Gordon E.; and Lopata, Ira L., 4,713,005, Cl. 433-180.000.
Loral Electro-Optical Systems, Inc.: *See*—
Dawson, Christopher; Healey, Fritz W.; and Taylor, Leo O., 4,712,885, Cl. 350-443.000.
Lord Corporation: *See*—
Miller, H. Timothy, 4,712,777, Cl. 267-140.100.
Losapio, Peter F.; Germer, Warren R.; Ouellette, Maurice J.; and Palmer, Ansell W., to General Electric Company. Battery backup installation for electric meter. 4,713,609, Cl. 324-156.000.
Losey, Walter N.; and Giometti, Paul F., to Facet Enterprises, Inc. Engine starter gearing. 4,712,435, Cl. 74-6.000.
Losser, Gerald L.; and Weaver, Richard D., to Allied Corporation. Solenoid control valve. 4,712,767, Cl. 251-129.140.
Loughlin, Thomas G.: *See*—
Clarkson, Bruce A.; Frere, Ronald J.; Loughlin, Thomas G.; Taylor, William W., Jr.; and Mongeau, Peter, 4,712,398, Cl. 70-276.000.
Louis, Raymond, to Gaz de France. Device for the melting of light metals. 4,712,774, Cl. 266-155.000.
Low, R. Glenn. Modular construction system. 4,712,352, Cl. 52-809.000.
Lowe, Gary C. Organizer for compact disc albums and the like. 4,712,679, Cl. 206-387.000.
Lowe, Henry E. Litter material for small animals. 4,712,508, Cl. 119-1.000.
Lu, Siat-Ling. Cleaning tape cartridge used in videotape recorders. 4,713,713, Cl. 360-128.000.
Lubelski, Daniel P.; and Baker, Rodney G., to Libbey-Owens-Ford Co. Infrared absorbing glass compositions. 4,713,359, Cl. 501-63.000.
Lubrizol Genetics, Inc.: *See*—
McLoughlin, Thomas J., 4,713,330, Cl. 435-34.000.
Lucas Industries public limited company: *See*—
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Dawes, Cyril; and Smith, Colin G., 4,713,122, Cl. 148-16.600.
Luckenbill, Lawrence F.: *See*—
Lair, John E.; Luckenbill, Lawrence F.; and Holliday, Richard J., 4,712,575, Cl. 137-218.000.
Ludwig, Bernd; and Stiehl, Dirk, to Square D Starkstrom GmbH. Switch gear. 4,713,498, Cl. 200-5.00R.
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Luitjen, Arend, 4,712,346, Cl. 52-311.000.
Luitjen, Arend, to Luijten, Arend; and de Vries, Robert, a part interest to each. Method for laying bricks in a herringbone pattern, and an accordingly manufactured brick structure. 4,712,346, Cl. 52-311.000.
Lukanich, Joseph D.: *See*—
Tortorello, Anthony J.; and Lukanich, Joseph D., 4,713,481, Cl. 560-159.000.
Lukas, Helmut H.; and Pacey, Grant K., to Northern Telecom Limited. Two-channel hermaphroditic fiber connector. 4,712,861, Cl. 350-96.210.
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Kosakowski, Alex S.; and Lundqvist, Mats A., 4,712,915, Cl. 356-152.000.
Lunsford, David; and Walker, James L., to National Starch and Chemical Corporation. Ethylene vinyl acetate compositions for flocking adhesives. 4,713,263, Cl. 427-206.000.
Lupke, Manfred A. A. Extrusion die for externally ribbed plastic tubing. 4,712,993, Cl. 425-466.000.
Luttermoller, Jurgen, to Kopperschmidt-Muller GmbH & Co. KG. Spraying method and device for applying a film to a workpiece. 4,713,257, Cl. 427-27.000.
Luttinger, Manfred: *See*—
Bailey, Philip E.; Pickett, Gordon E.; Luttinger, Manfred; and Umeda, Takashi, 4,713,407, Cl. 524-109.000.
Lutz, Bruce W.: *See*—
Gilman, Keith; and Lutz, Bruce W., 4,712,580, Cl. 137-512.150.
Lutz, Hans, to University of California, The Regents of the. Hybridomas producing monoclonal antibodies specific for FeLV p27. 4,713,325, Cl. 435-5.000.
Lutz, Michael, to Captive Plastics, Inc. Package employing unique seal. 4,712,699, Cl. 215-329.000.
Luxtron Corporation: *See*—
Ellis, Roger H.; and Alyea, John W., 4,712,864, Cl. 350-96.220.
Lydtin, Hans-Jurgen: *See*—
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Lyerly, David M.: *See*—
Wilkins, Tracy D.; and Lyerly, David M., 4,713,240, Cl. 424-92.000.
Lynam, Niall R.; and Seah, Kiok K., to Donnelly Corporation. Electrochromic mirror. 4,712,879, Cl. 350-357.000.
Lynch, William C.: *See*—
Walkiewicz, Zigmunt J., Jr.; and Lynch, William C., 4,712,459, Cl. 83-171.000.
Lyons, Leslie W.: *See*—
Cary, Arthur P.; and Lyons, Leslie W., 4,712,396, Cl. 70-129.000.
M.A.N.Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft: *See*—
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M.A.N.-Roland Druckmaschinen Aktiengesellschaft: *See*—
Kemmerer, Klemens; and Hummel, Peter, 4,712,475, Cl. 101-348.000.
M.C.B.: *See*—
Renaud, Jean-Marie; Gambs, Paul; Perrot, Jean-Claude; and Taillebois, Jacques, 4,713,541, Cl. 250-231.0SE.
M.C.L. Co., Ltd.: *See*—
Sasaki, Nobuyoshi; Baba, Susumu; and Arai, Hisahiro, 4,712,605, Cl. 164-516.000.
M&T Chemicals Inc.: *See*—
Hung, Paul L. K.; Radigan, Richard J.; and Rosen, David S., 4,713,298, Cl. 428-461.000.
MacDonald, Donald C., to GTE Government Systems Corporation. Fiber optic connector epoxy curing apparatus. 4,713,523, Cl. 219-385.000.
Macdonald, Kenneth A. B., to Boeing Company, The. Dual purpose gun barrel for spin stabilized or fin stabilized projectiles and gun launched rockets. 4,712,465, Cl. 89-16.000.
MacGee, Andrew, to United States of America, Air Force. Sliding duct seal. 4,712,370, Cl. 60-39.070.
MacGregor, David C., to Cordis Corporation. Sutures having a porous surface. 4,712,553, Cl. 128-335.500.
Macheboeuf, Guy, to Etablissment Public Telediffusion de France. System for superimposing plural television pictures with extent of superimposition based upon a linear combination of the picture signals. 4,713,695, Cl. 358-183.000.
Machida, Kunio: *See*—
Ozaki, Haruhiko; Yamada, Tadatoshi; Machida, Kunio; Ohno, Kiyoshi; Shimazaki, Hirato; Inoue, Hidekimi; and Uji, Ryohei, 4,713,686, Cl. 358-107.000.
Machida, Mamoru: *See*—
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Machida, Yukihiko: *See*—
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Mack, Lois: *See*—
Schultz, Thomas G.; Gross, Andrew; Pappas, Barbara; Shifrin, George D.; and Mack, Lois, 4,713,780, Cl. 364-514.000.
Mackiewicz, Ralph E.; and Kuhn, Michael A., to Westinghouse Electric Corp. Non-volatile memory device for a programmable controller. 4,713,756, Cl. 364-200.000.
Madsac, Michel, to L'Air Liquide. Process for sintering powdered material in a continuous furnace. 4,713,215, Cl. 419-8.000.
Maeda, Hironari: *See*—
Honda, Masahiro; and Maeda, Hironari, 4,712,961, Cl. 414-42.000.
Maekawa, Yukio: *See*—
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Maffrand, Jean-Pierre: *See*—
Bayol, Alain; Blanc, Francis; Lansen, Jacqueline; Maffrand, Jean-Pierre; and Pereillo, Jean-Marie, 4,713,373, Cl. 514-54.000.
Magar, Surendar S.; Essig, Daniel L.; Simpson, Richard D.; and Caudel, Edward R., to Texas Instruments Incorporated. Microprocessor with block move instruction. 4,713,748, Cl. 364-200.000.
Magar, Surendar S.; and Essig, Daniel L., to Texas Instruments Incorporated. Microprocessor with repeat instruction. 4,713,749, Cl. 364-200.000.
Magee, Kevin J.: *See*—
Birkenbach, Eugen J.; Eversole, Brad K.; and Magee, Kevin J., 4,712,622, Cl. 172-328.000.
Mager, Theodor: *See*—
Sutterlin, Norbert; Blitz, Hans-Dieter; Mager, Theodor; Jagsch, Karl-Heinz; and Tessmer, Dieter, 4,713,434, Cl. 526-62.000.
Magnan, Michael B.: *See*—
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Maher, Daniel V.: *See*—
Kidd, Geoffrey; Maher, Daniel V.; and Cywinski, Jozef, 4,712,558, Cl. 128-421.000.
Mahr, Paul S.: *See*—
Hayes, Michael L.; Mahr, Paul S.; and Tippie, John W., 4,713,770, Cl. 364-474.000.
Mahusky, John J.: *See*—
Jenkins, Robert H., Jr.; Mitchell, Edward; Gaetani, Frank J.; Mahusky, John J.; and Hall, Marilyn, 4,713,087, Cl. 44-53.000.
Maier, Alfred E., to Westinghouse Electric Corp. Circuit breaker with hinged arcing contact. 4,713,504, Cl. 200-146.00R.
Maier, Alfred E.; Leone, David A.; and Ricci, Louis N., to Westinghouse Electric Corp. Stored energy circuit breaker with ratchet mechanism for charging a contact closing spring. 4,713,637, Cl. 335-76.000.
Maier, Dietmar: *See*—
Lindstadt, Klaus; Halssig, Andreas; Maier, Dietmar; and Scholz, Stefan, 4,712,480, Cl. 102-427.000.
Maine Wild Blueberry Co.: *See*—
Ismail, Amr A., 4,713,252, Cl. 426-290.000.
Mak, Tak W., to Ontario Cancer Institute, The. T cell specific CDNA clone. 4,713,332, Cl. 435-70.000.
Makimoto, Toshio; Nishimura, Sadahiko; Matsuo, Masayuki; Abiko, Toshio; Ishizaki, Hirohumi; Kanda, Minoru; Nunoya, Hidetsugu; and Komatsu, Mikio, to Makimoto, Toshio; Nishimura, Sadahiko; and Matsushita Electric Works, Ltd. Planar microwave antenna having high antenna gain. 4,713,670, Cl. 343-700.0MS.
Malaval, Claude: *See*—
Dumay, Jean-Jacques; and Malaval, Claude, 4,713,214, Cl. 376-312.000.

**Malek, Fritz J., to Santa Barbara Research Center.** Retroreflector. 4,712,867, Cl. 350-103.000.

**Malhi, Satwinder:** *See*—
Womack, Richard H.; Banerjee, Sanjay K.; Shichijo, Hisashi; and Malhi, Satwinder, 4,713,678, Cl. 357-23.600.

**Mally, Timothy G., to Oscar Mayer Foods Corporation.** Food loaf slicing machine with improved stacking characteristics. 4,712,458, Cl. 83-86.000.

**Mandhy Products B.V. Cuyk:** *See*—
Koot, Hubertus H. M., 4,713,065, Cl. 604-329.000.

**Manduley, Flavio:** *See*—
Sharpe, Murem S.; Bryson, Eugene; Manduley, Flavio; Riordan, Eben M., II; and Flesser, Brian D., 4,713,761, Cl. 364-406.000.

**Mannesmann Rexroth GmbH:** *See*—
Kauss, Wolfgang; and Mucheyer, Norbert, 4,712,375, Cl. 60-405.000.
Schmitz, Jurgen, 4,712,470, Cl. 91-433.000.

**Manning, George C.** Mechanical digger toy. 4,712,968, Cl. 414-694.000.

**Mannuss, Siegfried:** *See*—
Essig, Willi; Mayer, Hans; and Mannuss, Siegfried, 4,713,502, Cl. 200-61.820.

**Mano, Hiroshi, to Sumitom Electric Industries, Ltd.** Porous structure of polytetrafluoroethylene and process for production thereof. 4,713,070, Cl. 623-1.000.

**Manoly, Arthur E., to Hughes Aircraft Company.** Method for securing a slow-wave structure in enveloping structure with crimped spacers. 4,712,293, Cl. 29-600.000.

**Manville Corporation:** *See*—
Schuster, Richard L., 4,712,728, Cl. 229-52.00B.

**Manzaroli, Giovanni V.:** *See*—
Andre, Jean-Daniel; Grossi, Pierre-Jean; Heymes, Alain; and Manzaroli, Giovanni V., 4,713,485, Cl. 562-470.000.

**Marcusse, Alain; and Pinel, Max, to Technal International S.A.** Load-carrying structure for making volume-enclosing constructions, in particular for placing against buildings. 4,712,337, Cl. 52-90.000.

**Markhart, Albert H., III, to University of Minnesota, Regents of the.** Hand operated press for tissue extraction. 4,713,344, Cl. 435-287.000.

**Markisello, Frank.** Method of protecting lock cylinders from being wrenched or pulled. 4,712,403, Cl. 70-417.000.

**Marks, Robert T., to Ranco Incorporated.** Reversing valve assembly with improved pilot valve mounting structure. 4,712,582, Cl. 137-625.290.

**Marley Cooling Tower Company, The:** *See*—
McGowan, Joseph L., 4,712,697, Cl. 212-189.000.

**Maroulis, Peter J.; Coe, Charles G.; Kuznicki, Steven M.; Clark, Patrick J.; and Roberts, David A., to Air Products and Chemicals, Inc.** Selective zeolitic adsorbent and a method for activation thereof. 4,713,362, Cl. 502-85.000.

**Marschall, Norbert:** *See*—
Senske, Wilhelm; Herkert, Roland; Marschall, Norbert; and Greeb, Karl-Heinrich, 4,713,311, Cl. 430-127.000.

**Marschik, David:** *See*—
Wolfe, William R.; and Marschik, David, 4,713,642, Cl. 336-92.000.

**Marse, Allan V.:** *See*—
Boos, Donald L.; and Marse, Allan V., 4,713,731, Cl. 361-433.000.

**Marsh, Frederick L.:** *See*—
Rao, Purushothama; and Marsh, Frederick L., 4,713,304, Cl. 429-136.000.

**Marsh, Gary B.; Fanelli, Anthony J.; Armor, John N.; and Zambri, Patrick M., to Allied Corporation.** Spray-dried inorganic oxides from non-aqueous gels or solutions. 4,713,233, Cl. 423-608.000.

**Marshall, Christopher B.; and French, Richard C., to U.S. Philips Corporation.** d.c. Block capacitor circuit for rejection of d.c. offset. 4,713,563, Cl. 307-490.000.

**Marshall, Howard B.; Kaye, Gordon E.; and Lopata, Ira L., to Marshall, Howard B.** Method and appratus for making a dental prosthesis and product therefrom. 4,713,005, Cl. 433-180.000.

**Marth, Kurt:** *See*—
Moll, Helmut; Wiegel, Gerd; Schindler, Josef; Scherer, Wilfried; and Marth, Kurt, 4,712,723, Cl. 228-111.000.

**Martin, Adolf:** *See*—
Erndt, Hans; Link, Erich; Martin, Adolf; Palloch, Herbert; and Wittler, Hilmar, 4,712,660, Cl. 192-18.00B.

**Martin, Victor G.** Electronic calendar and method for randomly selecting and displaying messages. 4,712,923, Cl. 368-10.000.

**Martinez, Donald G.** Turf plug pusher. 4,712,623, Cl. 172-817.000.

**Maruko Seiyaku Co., Ltd.:** *See*—
Ohno, Sachio; Ebihara, Yuko; Mizukoshi, Kiyoshi; Ichihara, Kenji; Ban, Takao; and Nagasaka, Mitsuaki, 4,713,457, Cl. 546-67.000.

**Maruno, Susumu; Nakata, Shinobu; Nagahiro, Michinori; and Minamide, Seiko, to Matsushita Electric Industrial Co., Ltd.** Gradation thermal printhead and gradation heat transfer printing apparatus. 4,712,930, Cl. 400-120.000.

**Maruyama, Masanori:** *See*—
Takayama, Shigehiko; Suzuki, Hitomi; Maruyama, Masanori; Fukushima, Masakazu; and Kurashige, Mitsuhiro, 4,713,588, Cl. 315-382.000.

**Marx, Christina S.:** *See*—
Siegel, Richard C.; Marx, Christina S.; Hargitay, Bartholomew; and Wotherspoon, Neil, 4,713,350, Cl. 436-533.000.

**Marx, Hans-Jurgen:** *See*—
Hosel, Fritz; Marx, Hans-Jurgen; and Temburg, Josef, 4,712,275, Cl. 19-80.00R.

**Maryanoff, Bruce E., to McNeilab, Inc.** Tetrahydroazeto [2,1-a]isoquinolines and methods for treating depression. 4,713,386, Cl. 514-294.000.

**Marzoni, Gifford P.; and Garbrecht, William L., to Eli Lilly and Company.** Alkoxy and dialkoxyalkyl esters of dihydrolysergic acid and related compounds useful as 5HT receptor antagonists. 4,713,385, Cl. 514-288.000.

**Masaki, Kouichi; and Kitamoto, Tatsuji, to Fuji Photo Film Co., Ltd.** Method for preparing ferromagnetic iron oxide particles. 4,713,261, Cl. 427-129.000.

**Mashimo, Toru, to Mazda Motor Corporation.** Rock drill with tunnel profile control system. 4,712,624, Cl. 173-43.000.

**Masina, Vittorino.** Multiple barrel rifle and trigger mechanism. 4,712,323, Cl. 42-42.010.

**Maskasky, Joe E., to Eastman Kodak Company.** Low methionine gelatino-peptizer tabular grain silver bromide and bromoiodide emulsions and processes for their preparation. 4,713,320, Cl. 430-567.000.

**Maskasky, Joe E., to Eastman Kodak Company.** Chloride containing tabular grain emulsions and processes for their preparation employing a low methionine gelatino-peptizer. 4,713,323, Cl. 430-569.000.

**Massachusetts Institute of Technology:** *See*—
Jasin, Maria; and Schimmel, Paul R., 4,713,337, Cl. 435-172.300.

**Masters, Timothy E.; and Wehrer, Wayne J., to Carroll Touch Inc.** Phototransistor apparatus with current injection ambient compensation. 4,713,534, Cl. 250-214.00B.

**Mastromattei, Robert, to Pacific Scientific Co.** Magnetically enhanced variable reluctance motor systems. 4,713,570, Cl. 310-154.000.

**Masucci, Ann M.** Rear seat mirror. 4,712,892, Cl. 350-631.000.

**Masuda, Ikuro:** *See*—
Ogiue, Katsumi; Suzuki, Yukio; Masuda, Ikuro; Odaka, Masanori; and Uchida, Hideaki, 4,713,796, Cl. 365-189.000.

**Masuda, Takayoshi:** *See*—
Ando, Shinji; Ohtaguro, Masami; Masuda, Takayoshi; and Watanabe, Yoshimoto, 4,713,245, Cl. 424-438.000.

**Masui, Takatoshi:** *See*—
Nagai, Toshinari; Masui, Takatoshi; Satou, Yasushi; and Katsuno, Toshiyasu, 4,712,373, Cl. 60-274.000.

**Mathias, Anthony D., to Dunlop Olympic Limited.** Method and apparatus of separating and transporting fabric pieces. 4,712,782, Cl. 271-21.000.

**Matlock, Dyer A.:** *See*—
Roberts, Bruce E.; Black, Jimmy C.; and Matlock, Dyer A., 4,713,260, Cl. 437-238.000.

**Matsubayashi, Tatsuhiko, to Kioritz Corporation.** Air-fuel mixture intake pipe for internal combustion engine. 4,712,523, Cl. 123-188.00M.

**Matsuhisa, Tadaaki; and Sasaki, Shingo, to NGK Insulators, Ltd.** Process for dewaxing ceramic molded bodies. 4,713,206, Cl. 264-328.200.

**Matsui, Hiroyasu:** *See*—
Ishikawa, Takashi; Fukagawa, Hiroshi; and Matsui, Hiroyasu, 4,713,696, Cl. 358-261.000.

**Matsui, Takashi:** *See*—
Yazaki, Takao; Noro, Masataka; and Matsui, Takashi, 4,713,282, Cl. 428-216.000.

**Matsumoto, Kouichi:** *See*—
Wakisaka, Yoshiharu; Uo, Junko; Matsumoto, Kouichi; Ohodaira, Osamu; and Tanaka, Kentaro, 4,713,241, Cl. 424-93.000.

**Matsumoto, Shiroh:** *See*—
Nakata, Akira; Matsumoto, Shiroh; Tozima, Hitoshi; and Minato, Masahiko, 4,712,706, Cl. 220-276.000.

**Matsuo, Masayuki:** *See*—
Makimoto, Toshio; Nishimura, Sadahiko; Matsuo, Masayuki; Abiko, Toshio; Ishizaki, Hirohumi; Kanda, Minoru; Nunoya, Hidetsugu; and Komatsu, Mikio, 4,713,670, Cl. 343-700.0MS.

**Matsuoka, Tadashi:** *See*—
Ikezaki, Yasuo; Matsuoka, Tadashi; and Mitani, Kazuyuki, 4,712,334, Cl. 51-262.00A.

**Matsushima, Kenichi:** *See*—
Tanaka, Fumihiro; Shimada, Yoshio; Yamaguchi, Kaneo; Matsushima, Kenichi; and Watanabe, Shinya, 4,713,691, Cl. 358-148.000.
Watanabe, Shinya; Tanaka, Fumihiro; Yamaguchi, Kaneo; Shimada, Yoshio; and Matsushima, Kenichi, 4,713,690, Cl. 358-148.000.

**Matsushita Electric Industrial Co., Ltd.:** *See*—
Gotou, Makoto; Mitani, Hiroshi; and Igarashi, Yoshiaki, 4,713,697, Cl. 358-222.000.
Maruno, Susumu; Nakata, Shinobu; Nagahiro, Michinori; and Minamide, Seiko, 4,712,930, Cl. 400-120.000.
Nishimura, Shigeru; and Kuroda, Toshihisa, 4,713,685, Cl. 358-103.000.

**Matsushita Electric Works, Ltd.:** *See*—
Kato, Yutaka, 4,713,016, Cl. 439-137.000.
Makimoto, Toshio; Nishimura, Sadahiko; Matsuo, Masayuki; Abiko, Toshio; Ishizaki, Hirohumi; Kanda, Minoru; Nunoya, Hidetsugu; and Komatsu, Mikio, 4,713,670, Cl. 343-700.0MS.

**Matsuura, Hiroyuki:** *See*—
Hoshino, Kazuya; and Matsuura, Hiroyuki, 4,713,614, Cl. 324-307.000.
Shimazaki, Toru; and Matsuura, Hiroyuki, 4,713,616, Cl. 324-309.000.

**Matsuyama, Kiyoshi; Suzuki, Takatoshi; and Chigusa, Takeshi, to Sumitomo Chemical Company, Limited.** Finishing method of polymer slurry. 4,713,444, Cl. 528-502.000.

**Mattes, Michael F.; and Dorland, Mark A., to SSI Technologies, Inc.** Dual magnetic coil driver and monitor sensor circuit. 4,712,648, Cl. 184-6.400.

Matthews, David, to Communications Satellite Corporation. BPSK Costas-type PLL circuit having false lock prevention. 4,713,630, Cl. 331-4.000.

Mattossovich, Maria, to Rielda Serrature S.R.L. Cylinder lock with interchangeable key. 4,712,399, Cl. 70-364.00A.

Matuz, Judit: *See*—
Ezer, Elemer; Harsanyi, Kalman; Petho, Hajnalka V.; Matuz, Judit; Szporny, Laszlo; Cholnoky, Eszter; Kuthi, Csaba; Trischler, Ferenc; Hegedus, Bela; Kapolnas, Marta; and Kallay, Anna, 4,713,388, Cl. 514-346.000.

Matzner, Markus: *See*—
Harris, James E.; Berger, Abe; Chopdekar, Vilas M.; Matzner, Markus; and Spanswick, James, 4,713,438, Cl. 528-337.000.

Maudgal, Shubha: *See*—
St. Clair, Terry L.; Maudgal, Shubha; and Pratt, J. Richard, 4,713,439, Cl. 528-353.000.

Maus, Wolfgang, to Interatom GmbH. Metallic catalyst body having thermal radiation protection. 4,713,361, Cl. 502-2.000.

Mayer, Geoffrey R.: *See*—
Bruno, Robert; Kipperman, Stuart R.; Mayer, Geoffrey R.; and Thomas, Michael, 4,713,064, Cl. 604-257.000.

Mayer, Hans: *See*—
Essig, Willi; Mayer, Hans; and Mannuss, Siegfried, 4,713,502, Cl. 200-61.820.

Mays, Alfred T.; and Wereson, Nicholas, to Chicopee. Double belt bonding of fibrous web comprising thermoplastic fibers on steam cans. 4,713,134, Cl. 156-181.000.

Mazda Motor Corporation: *See*—
Mashimo, Toru, 4,712,624, Cl. 173-43.000.

Mazorol, Earl A., Jr.: *See*—
Sullivan, Daniel C.; and Mazorol, Earl A., Jr., 4,712,388, Cl. 62-514.00R.

McCague, John A., to Owens-Corning Fiberglas Corporation. Method and apparatus for conveying molten material. 4,713,106, Cl. 65-128.000.

McCann, Gerald P.; Holoubek, Andrew J.; and Verley, Donald, to McCann's Engineering and Manufacturing Co. Liquid dispenser with automatic shut-off. 4,712,591, Cl. 141-88.000.

McCann's Engineering and Manufacturing Co.: *See*—
McCann, Gerald P.; Holoubek, Andrew J.; and Verley, Donald, 4,712,591, Cl. 141-88.000.

McCauley, Durham S.; and Sullivan, Jeffrey R., to McGard, Inc. Pipe plug and centering construction for centering ridged key in mating groove in pipe plug. 4,712,586, Cl. 138-89.000.

McClaran, Tom. Lumber surfacing machine. 4,712,596, Cl. 144-3.00R.

McCloskey, Paul S. Control and drive arrangement for movable members. 4,713,591, Cl. 318-257.000.

McCoy, Bobby G.: *See*—
McDuff, George L.; and McCoy, Bobby G., 4,712,502, Cl. 114-229.000.

McCuin, Jon P.: *See*—
Raabe, Rodney D.; Mrowka, Joseph J.; McCuin, Jon P.; and Noonan, Joseph F., 4,713,728, Cl. 361-363.000.

McDermott, Julian A., to Julian A. McDermott Corp. High voltage protector. 4,713,653, Cl. 340-654.000.

McDonald, Kenneth P.; Rangwala, Badruddin K.; Owen, Barry C.; and Rodocker, Frank A., to Ex-Cell-O Corporation. Container lift mechanism. 4,712,665, Cl. 198-346.200.

McDonald, Mark A., to Rockwell International Corporation. Continuously variable synchronizer apparatus. 4,713,830, Cl. 375-109.000.

McDonnell Douglas Corporation: *See*—
Cahill, Richard F.; Eck, Jeffrey A.; Schwantz, Gerald L.; Theriault, John P.; Turek, Philip A.; Udd, Eric; Wagoner, Raymond E.; and Wanser, Keith H., 4,712,306, Cl. 33-304.000.

McDuff, George L.; and McCoy, Bobby G. Seal pac diaper. 4,712,502, Cl. 114-229.000.

McGahan, Robert V.: *See*—
Poirier, J. Leon; and McGahan, Robert V., 4,713,667, Cl. 342-192.000.

McGard, Inc.: *See*—
McCauley, Durham S.; and Sullivan, Jeffrey R., 4,712,586, Cl. 138-89.000.

McGowan, Joseph L., to Marley Cooling Tower Company, The. Lightweight tower crane boom for conveying pumped concrete. 4,712,697, Cl. 212-189.000.

McHaney, James H.: *See*—
Wolcott, Herbert A.; and McHaney, James H., 4,712,579, Cl. 137-375.000.

McHenry, Robert J.: *See*—
Kudert, Frederick G.; Latreille, Maurice G.; McHenry, Robert J.; Nahill, George F.; Pfutzenreuter, Henry, III; Tennant, William A.; Tung, Thomas T.; and Vella, John, Jr., 4,712,990, Cl. 425-130.000.

McKenzie, Robert W.: *See*—
Hallford, Ben R.; and McKenzie, Robert W., 4,713,730, Cl. 361-419.000.

McLevige, William V., to United States of America, Air Force. Process of fabricating TiW/Si self-aligned gate for GaAs MESFETs. 4,712,291, Cl. 437-27.000.

McLoughlin, Thomas J., to Lubrizol Genetics, Inc. Visual bioassay for rhizobium competition variants. 4,713,330, Cl. 435-34.000.

McMillan, Larry; Paz de Araujo, Carlos; and Rohrer, George A., to Ramtron Corporation. Combined integrated circuit/ferroelectric memory device, and ion beam methods of constructing same. 4,713,157, Cl. 204-192.110.

McMillen, Russell G. Flexible mounting for splash/spray control guards and the like. 4,712,805, Cl. 280-154.50R.

McNeilab, Inc.: *See*—
Maryanoff, Bruce E., 4,713,386, Cl. 514-294.000.

McNutt, Adrian C.: *See*—
Earhart, Jonathan P.; Kostecki, John A.; and McNutt, Adrian C., 4,713,119, Cl. 134-3.000.

McSweeney, Hugh A. Vehicle recording system. 4,713,648, Cl. 340-52.00D.

Mead Corporation, The: *See*—
Adair, Paul C.; Hillenbrand, Gary F.; and Davis, Paul D., 4,713,312, Cl. 430-138.000.

Measuretek, Inc.: *See*—
Harrington, Richard H.; and Krapf, Charles W., 4,712,627, Cl. 177-50.000.

Measuria, Umakant: *See*—
Cogswell, Frederic N.; and Measuria, Umakant, 4,713,283, Cl. 428-240.000.

Meauze, Geordes: *See*—
Gely, Jean-Marie L.; Goutines, Marius J.; and Meauze, Geordes, 4,712,980, Cl. 416-224.000.

Mecklenfeld, Hermann: *See*—
Kirchhoff, Bernd; and Mecklenfeld, Hermann, 4,712,744, Cl. 241-80.000.

Medical College of Ohio: *See*—
Huttner, James; and Levine, Marc M., 4,713,057, Cl. 604-164.000.

Medical Engineering Corporation: *See*—
Carter, Garry L., 4,713,049, Cl. 604-8.000.

Medmetric Corporation: *See*—
Daniel, Dale M.; and Watkins, Kay R., 4,712,542, Cl. 128-92.00V.

Mehrgardt, Soenke, to Deutsche ITT Industries GmbH. Data reduction circuit. 4,713,828, Cl. 375-30.000.

Meier, Kurt: *See*—
Riediker, Martin; Meier, Kurt; and Zweifel, Hans, 4,713,401, Cl. 522-65.000.

Meisen, Klaus; and Towes, Peter, to Kleinewefers Textilmaschinen GmbH. Method of and apparatus for altering the moisture content of running webs. 4,712,472, Cl. 100-37.000.

Melanson, Lionel J.; and Watson, Richard C., to GTE Products Corporation. Electroceramic heating devices with welded leads. 4,713,529, Cl. 219-541.000.

Melnik, Joseph D.: *See*—
Remz, Harvey M.; Gordon, Philip J.; Cunningham, John D.; and Melnik, Joseph D., 4,712,571, Cl. 132-88.700.

Memmel, Lawrence C., to Super Tool and Mfg. Corporation. Apparatus for sensing the position of a structural member. 4,713,592, Cl. 318-565.000.

Mendicino, Franco: *See*—
Braga, Renzo; Pasquali, Renato; and Mendicino, Franco, 4,712,825, Cl. 296-76.000.

Menelly, Richard A. Solar energy storage cell. 4,712,606, Cl. 165-1.000.

Mercado, Romeo I., to Lockheed Missiles & Space Company, Inc. Lens doublet color-corrected for visible and near-infrared wavelengths. 4,712,886, Cl. 350-482.000.

Merck & Co., Inc.: *See*—
Chang, Michael N.; Thompson, Kathryn L.; and Boulton, David A., 4,713,393, Cl. 514-469.000.
Leanza, William J.; and Wildonger, Kenneth J., 4,713,451, Cl. 540-350.000.

Merck Patent Gesellschaft mit beschrankter Haftung: *See*—
Eidenschink, Rudolf; Krause, Joachim; Hittich, Reinhard; Poetsch, Eike; Scheuble, Bernhard; Weber, Georg; and Pohl, Ludwig, 4,713,197, Cl. 252-299.610.
Kramer, Josef; Irmscher, Klaus; Prucher, Helmut; and Hesch, Rolf-Dieter, 4,713,465, Cl. 549-403.000.
Praefcke, Klaus; Kohne, Bernd; Poetsch, Eike; and Herz, Claus P., 4,713,196, Cl. 252-299.010.

Merger, Franz; and Towae, Friedrich, to BASF Aktiengesellschaft. Process for the preparation of aliphatic di- and polyurethanes. 4,713,476, Cl. 560-115.000.

Merlin Gerin: *See*—
Baginski, Pierre; and Nebon, Jean-Pierre, 4,713,508, Cl. 200-153.0SC.

Merrien, Pierre A.: *See*—
Merrien, Pierre L.; and Merrien, Pierre A., 4,712,601, Cl. 164-150.000.

Merrien, Pierre L.; and Merrien, Pierre A., to Etude et Development en Metallurgie. Process and apparatus for automating a baking cycle under hot air of sand molds. 4,712,601, Cl. 164-150.000.

Messerschmidt, Robert G., to Spectra-Tech, Inc. Spectrophotometric image scrambler for full aperture microspectroscopy. 4,712,912, Cl. 356-73.000.

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Hirschel, Ernst H., 4,712,751, Cl. 244-119.000.

Metal Box p.l.c.: *See*—
Pavely, Andrew P., 4,712,707, Cl. 220-307.000.

Metelitsa, Vladimir I.: *See*—
Babaian, Eduard A.; Gerasimova, Galina A.; Davydov, Anatoly B.; Utyamyshev, Rustam I.; Khromov, Gennady L.; Metelitsa, Vladimir I.; Vikhert, Anatoly M.; Savvateev, Konstantin L.; Piotrovsky, Vladimir K.; and Novikova, Elizaveta B., 4,713,239, Cl. 424-81.000.

Metrologic Instruments, Inc.: *See*—
Knowles, Carl H., 4,713,532, Cl. 235-467.000.

Metz, Pierre; and Antonicelli, Marc, to Thomson Brandt Armements. Homing device for guided missiles using side nozzles. 4,712,747, Cl. 244-3.220.

Meyer, Manfred: *See—*
Voll, Horst; and Meyer, Manfred, 4,713,704, Cl. 360-97.000.

Michael, Wolfgang: *See—*
Roos, Gerhard; Dexling, Hartmut; and Michael, Wolfgang, 4,712,412, Cl. 72-345.000.

Michalski, Steven E., to Snap-on Tools Corporation. Digital timing light. 4,713,617, Cl. 324-395.000.

Michel, Christian G.; Schachter, Rozalie; Kuck, Mark A.; Baumann, John A.; and Raccah, Paul M., to Stauffer Chemical Company. Doping of catenated phosphorus materials. 4,713,192, Cl. 252-62.30R.

Michel, Karl H.; and Kastner, Ralph E., to Eli Lilly and Company. Microbial production of A41030 antibiotics. 4,713,331, Cl. 435-68.000.

Michel, Peter: *See—*
Adam, Peter; and Michel, Peter, 4,713,568, Cl. 310-112.000.

Michel, Pierre: *See—*
Cornet, Michel; and Michel, Pierre, 4,712,362, Cl. 56-16.500.

Microbio Resources, Inc.: *See—*
Nonomura, Arthur M., 4,713,398, Cl. 514-725.000.

Midorikawa, Masashi; and Inoh, Isamu, to Honda Giken Kogyo Kabushiki Kaisha. Vehicle door mirror with housing and base part including a soft flexible material. 4,712,891, Cl. 350-604.000.

Mienko, David K.: *See—*
Leigh-Monstevens, Keith V.; and Mienko, David K., 4,712,640, Cl. 180-336.000.

Mifune, Hiroyuki; Shishido, Tadao; and Suzuki, Yoshiaki, to Fuji Photo Film Co., Ltd. Process for preparing silver halide emulsion utilizing a photographically useful additive capable of being deactivated and a deactivating agent therefor and silver halide photographic material prepared by the process. 4,713,321, Cl. 430-569.000.

Mikami, Kazuo; Yamashita, Tsukasa; and Katoh, Mitsutaka, to Omron Tateisi Electronics Co. Optical waveguide and method of making the same. 4,712,854, Cl. 350-96.120.

Mikami, Nobuo: *See—*
Kamo, Yuichi; and Mikami, Nobuo, 4,713,638, Cl. 335-79.000.

Mikashima, Hiroshi: *See—*
Ao, Hideki; Obata, Minoru; Yamanaka, Tsutomu; and Mikashima, Hiroshi, 4,713,381, Cl. 514-222.000.

Mikawa, Toshimasa: *See—*
Sato, Akira; Sato, Kazuo; Saito, Takaharu; Shima, Junkoh; Mizutani, Kansei; and Mikawa, Toshimasa, 4,713,767, Cl. 364-453.000.

Milby, Gregory H.: *See—*
Lauffer, Donald K.; Milby, Gregory H.; Rostek, Paul M.; and Sanwo, Ikuo J., 4,713,827, Cl. 375-7.000.

Miles Laboratories, Inc.: *See—*
Chiang, John P.; and Lantero, Oreste J., Jr., 4,713,333, Cl. 435-96.000.

Miller, H. Timothy, to Lord Corporation. Fluid filled vibration isolator having precisely adjustable dynamic operating characteristics. 4,712,777, Cl. 267-140.100.

Mills, Ronald E.; and Perry, Peter J., to Chrysler Motors Corporation. Cup holder apparatus. 4,712,823, Cl. 296-37.800.

Minamide, Seiko: *See—*
Maruno, Susumu; Nakata, Shinobu; Nagahiro, Michinori; and Minamide, Seiko, 4,712,930, Cl. 400-120.000.

Minato, Masahiko: *See—*
Nakata, Akira; Matsumoto, Shiroh; Tozima, Hitoshi; and Minato, Masahiko, 4,712,706, Cl. 220-276.000.

Mine Safety Appliances Company: *See—*
Hiltz, Ralph H.; Greer, John S.; and Friel, Joseph V., 4,713,182, Cl. 252-3.000.

Miner Enterprises, Inc.: *See—*
Carlson, Robert L., 4,712,487, Cl. 105-199.300.

Minigrip, Inc.: *See—*
Boeckmann, Hugo, 4,712,684, Cl. 206-554.000.

Mining Tools, Inc. Div. of Smith California: *See—*
Shaw, Ray H., 4,712,626, Cl. 175-410.000.

Minior, Thaddeus: *See—*
Conover, Gilbert; Minior, Thaddeus; and Willis, John P., 4,713,165, Cl. 204-403.000.

Minnesota Mining and Manufacturing Company: *See—*
DeVore, Dale P.; Scherrer, Robert A.; and Scholz, Matthew T., 4,713,446, Cl. 530-356.000.
Sowman, Harold G.; and Kaar, David R., 4,713,300, Cl. 428-547.000.
Truskolaski, Bernard S., 4,713,267, Cl. 428-4.000.
Tung, Chi F.; and Coderre, James C., 4,712,868, Cl. 350-105.000.
Williams, Donald J., 4,713,280, Cl. 428-149.000.
Wyberg, Gregory R., 4,712,727, Cl. 206-631.300.

Minolta Camera KK: *See—*
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 4,712,904, Cl. 354-475.000.

Minolta Camera Kabushiki Kaisha: *See—*
Hosomizu, Hiroshi; Tsuji, Kenji; and Kamiya, Makoto, 4,712,902, Cl. 354-416.000.
Tanii, Junichi; and Maekawa, Yukio, 4,712,871, Cl. 350-257.000.

Minor, Cathy L. Pad of sheets for removing particulate matter. 4,713,274, Cl. 428-40.000.

Mirviss, Stanley B., to Stauffer Chemical Company. Racemization of amino acids. 4,713,470, Cl. 560-38.000.

Misumi, Akira; Hirai, Ryoji; and Watanabe, Rikizo, to Hitachi, Ltd.; and Hitachi Metals, Ltd. Color picture tube with shadow mask. 4,713,576, Cl. 313-402.000.

Mita Industrial Co., Ltd.: *See—*
Horihata, Katsushi; and Kawamori, Yoshizo, 4,713,672, Cl. 346-108.000.

Mitani, Hiroshi: *See—*
Gotou, Makoto; Mitani, Hiroshi; and Igarashi, Yoshiaki, 4,713,697, Cl. 358-222.000.

Mitani, Kazuyuki: *See—*
Ikezaki, Yasuo; Matsuoka, Tadashi; and Mitani, Kazuyuki, 4,712,334, Cl. 51-262.00A.

Mitani, Toragoro: *See—*
Nakashima, Toshimitsu; Okada, Wataru; and Mitani, Toragoro, 4,713,443, Cl. 528-499.000.

Mitani, Wataru: *See—*
Yoshizawa, Shuji; Mitani, Wataru; Yamamoto, Mariko; Sanjoh, Akira; and Ikezue, Tatsuya, 4,713,308, Cl. 430-65.000.

Mitchell, Allan T.; and Paterson, James L., to Texas Instruments Incorporated. Method for fabricating EPROM array. 4,713,142, Cl. 156-653.000.

Mitchell, David H.; and Mitchell, Ralph M., to Sensor Diagnostics, Inc. Measurement of ligand/anti-ligand interactions using bulk conductance. 4,713,347, Cl. 436-501.000.

Mitchell, Edward: *See—*
Jenkins, Robert H., Jr.; Mitchell, Edward; Gaetani, Frank J.; Mahusky, John J.; and Hall, Marilyn, 4,713,087, Cl. 44-53.000.

Mitchell, James W.: *See—*
Quick, James R.; Mitchell, James W.; and Cooley, Dennis A., 4,713,510, Cl. 219-10.55E.

Mitchell, Ralph M.: *See—*
Mitchell, David H.; and Mitchell, Ralph M., 4,713,347, Cl. 436-501.000.

Mitibata, Takashi: *See—*
Inagaki, Mitukane; Ohta, Masaki; Hyodo, Akihiko; Takenaka, Kenji; Mitibata, Takashi; Suzuki, Shinichi; and Kayukawa, Hiroaki, 4,712,982, Cl. 417-222.000.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Morishita, Akira; Okamoto, Kyoichi; Nakagawa, Taiichi; Morikane, Hiroyuki; Hasegawa, Akinori; Arima, Takemi; and Kounou, Tadami, 4,712,451, Cl. 74-801.000.
Niwa, Tomomitsu, 4,713,747, Cl. 364-170.000.
Yamada, Tutomu, 4,713,741, Cl. 363-50.000.
Yamagishi, Hideaki; and Oshimi, Tetsuro, 4,713,759, Cl. 364-200.000.
Yonemoto, Masashi, 4,713,595, Cl. 318-759.000.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Hagiwara, Haruo; Tsukamoto, Hideo; and Tsubaki, Yasuhiro, 4,712,392, Cl. 68-18.00C.

Mitsubishi Kinzoku Kabushiki Kaisha: *See—*
Yoshiki, Naokazu; Saito, Yutaka; and Haba, Tsuneo, 4,712,407, Cl. 72-68.000.

Mitsubishi Monsanto Chemical Company: *See—*
Ikuma, Sadao, 4,713,429, Cl. 526-87.000.

Mitsubishi Petrochemical Company Limited: *See—*
Horie, Shinji, 4,713,310, Cl. 430-109.000.
Yazaki, Takao; Noro, Masataka; and Matsui, Takashi, 4,713,282, Cl. 428-216.000.

Mitsubishi Rayon Co., Ltd.: *See—*
Gotoh, Hajime; Machida, Mamoru; and Sugiyama, Osamu, 4,713,276, Cl. 428-113.000.
Sasaki, Makoto; Yoshida, Jun; Shimizu, Yoshishige; Akazawa, Kiyoshi; Kishita, Eiji; and Hirata, Kaoru, 4,713,291, Cl. 428-373.000.
Takemura, Tohru; Itoh, Hajime; Kamo, Jun; and Yoshida, Haruhiko, 4,713,292, Cl. 428-373.000.

Mitsui Toatsu Chemicals, Incorporated: *See—*
Ando, Shinji; Ohtaguro, Masami; Masuda, Takayoshi; and Watanabe, Yoshimoto, 4,713,245, Cl. 424-438.000.

Miura, Kuniaki: *See—*
Kuwahara, Kazuyoshi; Fukushima, Isao; Miura, Kuniaki; and Kano, Kenji, 4,713,700, Cl. 358-315.000.

Miura, Masanobu, to Takiron Co., Ltd. Dot matrix luminous display. 4,713,579, Cl. 313-500.000.

Miyamoto, Shoji: *See—*
Kosaka, Michitaka; Kawano, Katsumi; and Miyamoto, Shoji, 4,713,768, Cl. 364-460.000.

Miyano, Seiji: *See—*
Tatsuoka, Toshio; Suzuki, Kenji; Ito, Kayoko; Satoh, Fumio; Miyano, Seiji; and Sumoto, K[illegible], 4,713,453, Cl. 544-60.000.

Miyashita, Kunio: *See—*
Takahashi, Tadashi; Miyashita, Kunio; and Kawamata, Syooichi, 4,713,613, Cl. 324-208.000.

Miyata, Masanori: *See—*
Nakayama, Tomobumi; Mori, Toshihiko; Hirose, Masayuki; Ohbuchi, Toru; Miyata, Masanori; Nakamura, Shinichi; and Honjo, Takeshi, 4,712,908, Cl. 355-14.0SH.

Mizota, Yasuhiro, to NEC Corporation. Time division multiple access radio communications system. 4,713,809, Cl. 370-97.000.

Mizukoshi, Kiyoshi: *See—*
Ohno, Sachio; Ebihara, Yuko; Mizukoshi, Kiyoshi; Ichihara, Kenji; Ban, Takao; and Nagasaka, Mitsuaki, 4,713,457, Cl. 546-67.000.

Mizuno, Tiaki: *See—*
Abe, Tomoaki; Fujisawa, Hideya; Omori, Norio; Kinugawa, Masumi; Ito, Katsunori; Akiyama, Susumu; Mizuno, Tiaki; and Yamada, Toshitaka, 4,713,765, Cl. 364-431.050.

Mizuta, Atsuo: *See*—
Kokubo, Ichiro; Mizuta, Atsuo; Yamamoto, Yoshitaka; and Kitazawa, Jitsuo, 4,712,414, Cl. 72-366.000.

Mizutani, Kansei: *See*—
Sato, Akira; Sato, Kazuo; Saito, Takaharu; Shima, Junkoh; Mizutani, Kansei; and Mikawa, Toshimasa, 4,713,767, Cl. 364-453.000.

Mobil Oil Corporation: *See*—
Derouane, Eric G.; and Ballmoos, Roland V., 4,713,227, Cl. 423-305.000.
Ehlers, D. M.; and Hopkins, Daniel N., 4,712,616, Cl. 166-266.000.
Su, Tien-Kuei, 4,713,205, Cl. 264-176.100.

Mobley, Dewey F.; Warren, Janice M.; Barbrick, August; and Eisenmann, Gregg A., to Interlock Corporation. Tab receptacle terminal having improved electrical and mechanical features. 4,713,026, Cl. 439-845.000.

Mock, Gerald L.: *See*—
Bond, Raymond G.; and Mock, Gerald L., 4,713,835, Cl. 379-79.000.

Modena, Giorgio: *See*—
De Lucchi, Ottorino; Filippuzzi, Fabiola; Modena, Giorgio; and Camera, Ettore, 4,713,466, Cl. 549-464.000.

Moggio, William A.: *See*—
Bohrn, Walter J.; Lewis, Robert D.; and Moggio, William A., 4,713,084, Cl. 8-561.000.

Mogi, Tomonori; and Kashio, Yoshiaki, to Honda Giken Kogyo Kabushiki Kaisha. Straddle type vehicle seat assembly. 4,712,637, Cl. 180-219.000.

Mohanraj, Subramaniam; and Ford, Warren T. Method of chlorinating methyl groups of methyl vinyl aromatic polymers. 4,713,423, Cl. 525-351.000.

Mold-Masters Limited: *See*—
Basnett, David T., 4,712,995, Cl. 425-562.000.

Molecular Diagnostics, Inc.: *See*—
Dattagupta, Nanibhushan; and Crothers, Donald M., 4,713,326, Cl. 435-6.000.

Molex Incorporated: *See*—
Bixler, Craig A.; and Triner, Irvin R., 4,713,023, Cl. 439-393.000.
Edgley, Richard, 4,712,848, Cl. 439-327.000.
Regnier, Kent E.; Hoover, Thomas C.; and Walse, Alan S., 4,713,013, Cl. 439-62.000.

Moll, Helmut; Wiegel, Gerd; Schindler, Josef; Scherer, Wilfried; and Marth, Kurt, to Siemens Aktiengesellschaft. Method for bonding an insulated wire element on a contact. 4,712,723, Cl. 228-111.000.

Molnar, Gyorgy: *See*—
David, Dezso; Rovo, Peter; Sipos nee Richter, Terez; Molnar, Gyorgy; Deme, Istvan; and Karnitscher, Tamas, 4,713,078, Cl. 8-94.150.

Molz, Theodor, to W. Eckold AG. Apparatus for bending tubular workpieces. 4,712,406, Cl. 72-23.000.

Momonoi, Kaishu: *See*—
Watanabe, Isao; Momonoi, Kaishu; Hiraiwa, Toru; Ono, Satoshi; Nakano, Joji; Nagumo, Katsuyuki; and Takagi, Hiroyasu, 4,713,387, Cl. 514-332.000.

Monahan, Brian J. Randomly and integrally re-keyable lock apparatus and method. 4,712,401, Cl. 70-382.000.

Monahan, Brian J. Integrally and sequentially re-keyable lock apparatus and method. 4,712,402, Cl. 70-383.000.

Mondor, Edward J., III, to Woven Electronics Corporation. Flat woven cable for insulation displaceable connector termination and method. 4,712,298, Cl. 29-861.000.

Money, Dudley P.: *See*—
Seshamani, Venkatraman; and Money, Dudley P., 4,712,938, Cl. 403-24.000.

Mongeau, Peter: *See*—
Clarkson, Bruce A.; Frere, Ronald J.; Loughlin, Thomas G.; Taylor, William W., Jr.; and Mongeau, Peter, 4,712,398, Cl. 70-276.000.

Monogram Industries, Inc.: *See*—
Razavi, Fereidoon, 4,713,645, Cl. 337-246.000.

Monroe Auto Equipment Company: *See*—
Bethell, Michael R.; Gaines, Michael G.; Mowat, James F., Jr.; Wheeler, Roger D.; and Woidke, Richard P., 4,712,353, Cl. 53-80.000.

Monsanto Company: *See*—
Lavengood, Richard E.; Padwa, Allen R.; and Harris, Alva F., 4,713,415, Cl. 525-66.000.

Montandon, Daniel, to Nirvana Espar Systems S.A. Mast for sailboat. 4,712,500, Cl. 114-90.000.

Montedison S.p.A.: *See*—
Del Giudice, Luciano; Nocci, Roberto; Giannini, Umberto; and Gianotti, Giuseppe, 4,713,416, Cl. 525-68.000.

Montgomery, Dean P.; Gall, James W.; and Davis, Ed D., to Phillips Petroleum Company. Crude oil refining apparatus. 4,713,221, Cl. 422-190.000.

Montroll, Andrew H.: *See*—
Bradford, James N.; Ames, Jimmy R.; and Montroll, Andrew H., 4,713,821, Cl. 372-44.000.

Moomaw, David E., to Quaker Oats Company, The. Toy simulator power driven reciprocating saw workshop. 4,713,036, Cl. 446-145.000.

Moore, Richard A., to Western Publishing Company, Inc. Combination food carrier and amusement device. 4,712,673, Cl. 206-232.000.

Moore, Timothy J. Container with integral fold-in closure lid. 4,712,725, Cl. 229-8.000.

Moore, William G.; and Nagoda, Louis E., to Westinghouse Electric Corp. Apparatus for enclosing and cooling turbine generator collector sets. 4,713,566, Cl. 310-58.000.

Mor, Yeshayahu: *See*—
Damouny, Nabil G.; Huang, Min-Siu; Wilnai, Dan; and Mor, Yeshayahu, 4,713,750, Cl. 364-200.000.

Morag, Meir. Information display system. 4,713,651, Cl. 340-407.000.

Morel, Didier: *See*—
Morel, Jacques; and Morel, Didier, 4,712,285, Cl. 29-458.000.

Morel, Jacques; and Morel, Didier, to Etablissements Morel - Ateliers Electromecaniques de Favieres. Method for achieving fluid-tightness of a plastic sleeve for protecting splices of electric cables or telephone cables. 4,712,285, Cl. 29-458.000.

Moreland, Peter J., to Imperial Chemical Industries PLC. Current leakage apparatus in electrolytic cell. 4,713,160, Cl. 204-231.000.

Morell, Joseph; and Petrini, Roland, to Salomon S. A. Ski boot. 4,712,315, Cl. 36-117.000.

Morgenstern, Bernd: *See*—
Weigend, Helmut; Morgenstern, Bernd; and Reinhardt, Peter, 4,712,918, Cl. 356-429.000.

Mori, Toshihiko: *See*—
Nakayama, Tomobumi; Mori, Toshihiko; Hirose, Masayuki; Ohbuchi, Toru; Miyata, Masanori; Nakamura, Shinichi; and Honjo, Takeshi, 4,712,908, Cl. 355-14.0SH.

Morigi, Rodolfo: *See*—
Antolini, Adriano; Morigi, Rodolfo; and Saviotti, Giancarlo, 4,712,832, Cl. 297-180.000.

Morikane, Hiroyuki: *See*—
Morishita, Akira; Okamoto, Kyoichi; Nakagawa, Taiichi; Morikane, Hiroyuki; Hasegawa, Akinori; Arima, Takemi; and Kounou, Tadami, 4,712,451, Cl. 74-801.000.

Morimoto, Kazuo: *See*—
Akiyama, Shigeru; Ueno, Hidetoshi; Imagawa, Koji; Kitahara, Akira; Nagata, Sumio; Morimoto, Kazuo; Nishikawa, Tooru; and Itoh, Masao, 4,713,277, Cl. 428-131.000.

Morinaga & Co., Ltd.: *See*—
Kajihara, Isamu, 4,713,096, Cl. 55-204.000.

Morishita, Akira; Okamoto, Kyoichi; Nakagawa, Taiichi; Morikane, Hiroyuki; Hasegawa, Akinori; Arima, Takemi; and Kounou, Tadami, to Mitsubishi Denki Kabushiki Kaisha. Starter with a gear reduction mechanism. 4,712,451, Cl. 74-801.000.

Morishita, Mitsuhiro: *See*—
Sugimori, Masayasu; and Morishita, Mitsuhiro, 4,713,813, Cl. 371-15.000.

Morisod, Jean-Bernard, to Bobst SA. Counting method and device. 4,713,831, Cl. 377-8.000.

Morita, Toshiki, to Brother Kogyo Kabushiki Kaisha. Ribbon guide device. 4,712,932, Cl. 400-208.100.

Moritani, Takeshi: *See*—
Aoyama, Akimasa; Moritani, Takeshi; Yonezu, Kiyoshi; Negi, Taichi; and Okaya, Takuji, 4,713,296, Cl. 428-412.000.

Moroto, Shuzo: *See*—
Sumiya, Koji; and Moroto, Shuzo, 4,712,635, Cl. 180-197.000.

Morris, Robert C.; Long, Margaret N.; Chin, Timothy C.; and Heller, Donald F., to Allied Corporation. Thermal lensing-compensated lanthanum beryllate laser. 4,713,820, Cl. 372-41.000.

Morton, Bruce L.; and Engles, Bruce E., to Motorola Inc. Current mirror sense amplifier for a non-volatile memory. 4,713,797, Cl. 365-208.000.

Morton Thiokol, Inc.: *See*—
Hoover, M. Fred; and Guilbault, Lawrence J., 4,713,236, Cl. 424-70.000.

Mory, Steven W.: *See*—
Crawford, Donald C.; Ross, Jeffrey L.; Strike, Gary P.; and Mory, Steven W., 4,712,357, Cl. 53-450.000.

Moseley, Richard B.: *See*—
Brearley, Malcolm; and Moseley, Richard B., 4,712,839, Cl. 303-3.000.

Moser, Kenneth B.: *See*—
Downs, John D.; Drury, Raymond L., Jr.; Moser, Kenneth B.; and Roth, C. Deane, 4,713,436, Cl. 528-295.300.

Motev, Phil, to American Screen Printing Equipment Company. Automatic article handling and screen printing apparatus. 4,712,474, Cl. 101-38.00A.

Motoi, Taiko: *See*—
Sekimura, Nobuyuki; Kamio, Masaru; Takao, Hideaki; Motoi, Taiko; and Murata, Tatsuo, 4,712,874, Cl. 350-339.00F.

Motorola Computer Systems, Inc.: *See*—
Gatti, John E.; and Tarver, Carl R., 4,713,714, Cl. 360-137.000.

Motorola, Inc.: *See*—
Davis, Walter L., 4,713,599, Cl. 323-312.000.
Davis, William F.; and Vyne, Robert L., 4,713,680, Cl. 357-51.000.
Enderby, Ralph T.; Ferrer, Enrique; and Shepherd, Wayne P., 4,713,631, Cl. 331-36.00C.
Kloker, Kevin L.; and Cieslak, Ronald H., 4,713,790, Cl. 364-784.000.
Morton, Bruce L.; and Engles, Bruce E., 4,713,797, Cl. 365-208.000.
Susak, David M.; and Vyne, Robert L., 4,713,626, Cl. 330-253.000.
Townsend, Greg M.; and DiPrizio, Giuseppe M., 4,713,553, Cl. 307-64.000.
Wanchoo, Sanjay; and Muri, David L., 4,713,622, Cl. 328-61.000.
Whatley, Roger A., 4,713,625, Cl. 330-149.000.

Mowat, James F., Jr.: *See*—
Bethell, Michael R.; Gaines, Michael G.; Mowat, James F., Jr.; Wheeler, Roger D.; and Woidke, Richard P., 4,712,353, Cl. 53-80.000.

Mower, Dan C.; Wolf, Peter H.; Slade, Boyd E.; and Albertalli, David, to Dataproducts Corporation. Control system for matrix print head. 4,713,623, Cl. 328-72.000.

Moynihan, Patrick B. Air compressor accessory driven by portable electric drill. 4,712,983, Cl. 417-234.000.

Mrowka, Joseph J.: *See—*
Raabe, Rodney D.; Mrowka, Joseph J.; McCuin, Jon P.; and Noonan, Joseph F., 4,713,728, Cl. 361-363.000.

Mucciarone, Domenick. Sealing spout for paper cartons. 4,712,714, Cl. 222-91.000.

Mucheyer, Norbert: *See—*
Kauss, Wolfgang; and Mucheyer, Norbert, 4,712,375, Cl. 60-405.000.

Mueller, Theodore V. Auxiliary door latch for children's safety. 4,712,816, Cl. 292-253.000.

Mukaida, Yoshito: *See—*
Nishikawa, Yasuo; Okita, Tsutomu; Mukaida, Yoshito; Niinomi, Masahiro; Yanagihara, Kenji; and Kimura, Mituo, 4,713,287, Cl. 428-336.000.

Mulhaupt, Rolf; Renner, Alfred; and Lauterbach, Horst, to Ciba-Geigy Corporation. Branched polyesters. 4,713,428, Cl. 525-523.000.

Muller, Dietmar; and Kremp, Jurgen, to Fraunhofer-Gesellschaft zur Forderung der angewandten. Triplebasic propellant powder and process for the production thereof. 4,713,127, Cl. 149-98.000.

Mungall, Dennis R.: *See—*
Allen, Jimmy D.; Cobb, Michael E.; Hillman, Robert S.; Mungall, Dennis R.; Ostoich, Vladimir E.; and Stroy, Gary H., 4,712,460, Cl. 83-208.000.

Munro, Dougald G. Tractor-trailer fluid pressure brake monitoring system. 4,712,422, Cl. 73-129.000.

Murakami, Kakuji: *See—*
Shimada, Masaru; Kawanishi, Toshiyuki; Murakami, Kakuji; Aruga, Tamotsu; and Uemura, Hiroyuki, 4,713,113, Cl. 106-22.000.

Murakami, Yuichi: *See—*
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Murata Manufacturing Co., Ltd.: *See—*
Nishikawa, Toshio; and Tamura, Sadahiro, 4,713,632, Cl. 331-117.00D.
Saito, Koji; and Okawa, Hiroshi, 4,713,633, Cl. 333-222.000.

Murata, Tatsuo: *See—*
Sekimura, Nobuyuki; Kamio, Masaru; Takao, Hideaki; Motoi, Taiko; and Murata, Tatsuo, 4,712,874, Cl. 350-339.00F.

Murbach, Urs: *See—*
Kunz, Rino E.; Junghaus, Jurgen R.; Knus, Jean A.; Murbach, Urs; and Tuor, Marcel F., 4,713,537, Cl. 250-227.000.

Muri, David L.: *See—*
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Murphy, Glenn L.; Borona, Russell T.; and Gelzheiser, Francis L., to Westinghouse Electric Corp. Molded-case circuit breaker with improved contact arm assembly, toggle link means and arc shield component. 4,713,640, Cl. 335-194.000.

Murray, Daniel J.: *See—*
Woo, Edmund P.; and Murray, Daniel J., 4,713,442, Cl. 528-422.000.

Murray, David L., to Deutz-Allis Corporation. Implement position adjusting device. 4,712,492, Cl. 111-88.000.

Mutter, Heinz: *See—*
Sommer, Hans-Jorg; Mutter, Heinz; Wirz, Armin; and Graf, Felix, 4,713,655, Cl. 340-677.000.

Myers, Jay E.; Myers, M. Todd; and Iravantchi, Siamak, to Andiamo Inc. Method and means for sealing a carrying case. 4,712,657, Cl. 190-28.000.

Myers, M. Todd: *See—*
Myers, Jay E.; Myers, M. Todd; and Iravantchi, Siamak, 4,712,657, Cl. 190-28.000.

N. V. Bekaert S. A.: *See—*
Adriaensen, Ludo; and Decouttere, Bernard, 4,713,153, Cl. 204-144.500.

Naert, Michel S., to AB Volvo. Vehicle back-seat. 4,712,824, Cl. 296-65.00R.

Nagahiro, Michinori: *See—*
Maruno, Susumu; Nakata, Shinobu; Nagahiro, Michinori; and Minamide, Seiko, 4,712,930, Cl. 400-120.000.

Nagai, Toshinari; Masui, Takatoshi; Satou, Yasushi; and Katsuno, Toshiyasu, to Toyota Jidosha Kabushiki Kaisha. Double air-fuel ratio sensor system having improved response characteristics. 4,712,373, Cl. 60-274.000.

Nagasaka, Mitsuaki: *See—*
Ohno, Sachio; Ebihara, Yuko; Mizukoshi, Kiyoshi; Ichihara, Kenji; Ban, Takao; and Nagasaka, Mitsuaki, 4,713,457, Cl. 546-67.000.

Nagasaki, Fumihiko: *See—*
Ikura, Katsuyata; Hagiwara, Kenji; Nagasaki, Fumihiko; Yamada, Tomio; Takahashi, Hidemitsu; and Hatano, Renpei, 4,713,396, Cl. 514-594.000.

Nagasaki, Tatsuo: *See—*
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Nagata, Sumio: *See—*
Akiyama, Shigeru; Ueno, Hidetoshi; Imagawa, Koji; Kitahara, Akira; Nagata, Sumio; Morimoto, Kazuo; Nishikawa, Tooru; and Itoh, Masao, 4,713,277, Cl. 428-131.000.

Nagayama, Susumu: *See—*
Yamazaki, Shunpei; Itoh, Kenji; and Nagayama, Susumu, 4,713,518, Cl. 219-121.0LM.

Nagoda, Louis E.: *See—*
Moore, William G.; and Nagoda, Louis E., 4,713,566, Cl. 310-58.000.

Nagumo, Katsuyuki: *See—*
Watanabe, Isao; Momonoi, Kaishu; Hiraiwa, Toru; Ono, Satoshi; Nakano, Joji; Nagumo, Katsuyuki; and Takagi, Hiroyasu, 4,713,387, Cl. 514-332.000.

Nahas, Robert C.; and Strolle, Clifford H., to Du Pont de Nemours, E. I., and Company. Process for curing a coating composition of an acrylic polymer and a polyisocyanate with an amine vapor catalyst. 4,713,265, Cl. 427-341.000.

Nahill, George F.: *See—*
Kudert, Frederick G.; Latreille, Maurice G.; McHenry, Robert J.; Nahill, George F.; Pfutzenreuter, Henry, III; Tennant, William A.; Tung, Thomas T.; and Vella, John, Jr., 4,712,990, Cl. 425-130.000.

Nakagawa, Taiichi: *See—*
Morishita, Akira; Okamoto, Kyoichi; Nakagawa, Taiichi; Morikane, Hiroyuki; Hasegawa, Akinori; Arima, Takemi; and Kounou, Tadami, 4,712,451, Cl. 74-801.000.

Nakagawa, Toyoaki: *See—*
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Nakai, Masaaki: *See—*
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 4,712,904, Cl. 354-475.000.

Nakajima, Keisuke: *See—*
Hirama, Shinichi; Nishiyama, Toshio; Ohta, Youichi; Uzuka, Makoto; Tomita, Kenichi; Nakajima, Keisuke; and Furuse, Kazumaro, 4,713,397, Cl. 514-690.000.

Nakamura, Haruhiko; and Tempaku, Junya, to Fujitsu Limited. Phase synchronization circuit. 4,713,621, Cl. 328-55.000.

Nakamura, Hiro; Ohkawa, Shuji; Ohtsuka, Yasuo; Tachikawa, Hajime; and Shinozaki, Toshiya, to Hitachi, Ltd. Method for handling a work in a robot system. 4,712,970, Cl. 414-730.000.

Nakamura, Kozoo; Kozima, Yasuyuki; Hamada, Nagaharu; and Sakata, Kunihiro, to Hitachi, Ltd. A method of controlling the movement of a medium to be printed. 4,713,699, Cl. 358-296.000.

Nakamura, Makoto; Takahashi, Mitsuru; Osawa, Namieki; and Murakami, Yuichi, to Nissan Motor Co., Ltd. Belt tensioner unit for internal combustion engine or the like. 4,713,044, Cl. 474-135.000.

Nakamura, Shinichi; and Ohbayashi, Keiji, to Konishiroku Photo Industry Co., Ltd. Silver halide color photographic material. 4,713,317, Cl. 430-551.000.

Nakamura, Shinichi: *See—*
Nakayama, Tomobumi; Mori, Toshihiko; Hirose, Masayuki; Ohbuchi, Toru; Miyata, Masanori; Nakamura, Shinichi; and Honjo, Takeshi, 4,712,908, Cl. 355-14.0SH.

Nakano, Hirohumi: *See—*
Higuchi, Seizun; Oga, Tomonari; Ikeda, Masao; and Nakano, Hirohumi, 4,713,301, Cl. 428-628.000.

Nakano, Joji: *See—*
Watanabe, Isao; Momonoi, Kaishu; Hiraiwa, Toru; Ono, Satoshi; Nakano, Joji; Nagumo, Katsuyuki; and Takagi, Hiroyasu, 4,713,387, Cl. 514-332.000.

Nakao, Reiro: *See—*
Kikuchi, Yoshikazu; and Nakao, Reiro, 4,713,092, Cl. 55-130.000.

Nakashima, Seiichiro; Toyoda, Kenichi; Inagaki, Shigemi; and Otsuka, Kazuhisa, to Fanuc Ltd. Cable supporting arrangement in industrial robots. 4,712,972, Cl. 414-744.00R.

Nakashima, Toshimitsu; Okada, Wataru; and Mitani, Toragoro, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Process for removing organic compound having high boiling point from a floatable polymer. 4,713,443, Cl. 528-499.000.

Nakata, Akira; Matsumoto, Shiroh; Tozima, Hitoshi; and Minato, Masahiko, to Hokkai Can Co., Ltd. Easy open type can. 4,712,706, Cl. 220-276.000.

Nakata, Shinobu: *See—*
Maruno, Susumu; Nakata, Shinobu; Nagahiro, Michinori; and Minamide, Seiko, 4,712,930, Cl. 400-120.000.

Nakayama, Kouichi, to Aisin Seiki Kabushiki Kaisha. Driving apparatus for stirling cycle engine. 4,712,378, Cl. 60-525.000.

Nakayama, Tomobumi; Mori, Toshihiko; Hirose, Masayuki; Ohbuchi, Toru; Miyata, Masanori; Nakamura, Shinichi; and Honjo, Takeshi, to Canon Kabushiki Kaisha. Image forming apparatus. 4,712,908, Cl. 355-14.0SH.

Nakovammaisten Keskusliitto ry: *See—*
Jalava, Antti, 4,713,495, Cl. 178-2.00R.

Nalco Chemical Company: *See—*
Bhattacharyya, Bhupati R.; and Dalsin, Philip D., 4,713,431, Cl. 526-207.000.
Fong, Dodd W.; and Halverson, Ann M., 4,713,178, Cl. 210-734.000.
Owen, David O.; and Connelly, Lawrence J., 4,713,222, Cl. 423-122.000.

Nalesnik, Theodore E.; and Benfaremo, Nicholas, to Texaco, Inc. Precoupled mono-succinimide lubricating oil dispersants and viton seal additives. 4,713,189, Cl. 252-51.50A.

Nalesnik, Theodore E., to Texaco Inc. Diiscyanate acid lubricating oil dispersant and viton seal additives. 4,713,191, Cl. 252-51.50A.

Namba, Kenryo; Asami, Shigeru; Aoi, Toshiki; Takahashi, Kazuo; and Kuroiwa, Akihiko, to TDK Corporation. Optical recording medium. 4,713,314, Cl. 430-270.000.

Nance, J. Kregg. Stringed instrument finger positioning guide. 4,712,464, Cl. 84-485.00R.

Narasimhan, Rajagopalan: *See—*
Childs, Ernest A.; and Narasimhan, Rajagopalan, 4,713,254, Cl. 426-582.000.

Narita, Hiroshi: *See—*
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Narva, Kenneth E.: *See—*
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Nash, William H.; and Fowler, Eugene C., to Cooper Industries, Inc. Vacuum fuse. 4,713,644, Cl. 337-158.000.

Nation, Richard V.: *See—*
Edwards, Wayne; Nation, Richard V.; and Tomkins, Keith A., 4,712,957, Cl. 411-82.000.

National Distillers and Chemical Corporation: *See—*
Clark, Clarence E., Jr.; and Fayter, Richard G., Jr., 4,713,479, Cl. 560-124.000.
Fayter, Richard G., Jr., 4,713,478, Cl. 560-124.000.
Huynh, Anh N.; and Ziogas, Phoivos D., 4,713,220, Cl. 422-186.160.

National Research Development Corporation: *See—*
Elliott, Michael; Janes, Norman F.; and Khambay, Bhupinder P. S., 4,713,392, Cl. 514-464.000.

National Starch and Chemical Corporation: *See—*
Beh-Forrest, Eric; and Flanagan, Thomas P., 4,712,808, Cl. 281-15.00R.
Lunsford, David; and Walker, James L., 4,713,263, Cl. 427-206.000.

Natsume, Yukihito, to Brother Kogyo Kabushiki Kaisha. Ribbon guide device including a separate, longitudinally shiftable, ribbon guide member. 4,712,933, Cl. 400-248.000.

Nawojski, Julius W.; and Nawojski, Walter. Variable speed control. 4,712,438, Cl. 74-63.000.

Nawojski, Walter: *See—*
Nawojski, Julius W.; and Nawojski, Walter, 4,712,438, Cl. 74-63.000.

NCR Corporation: *See—*
Lauffer, Donald K.; Milby, Gregory H.; Rostek, Paul M.; and Sanwo, Ikuo J., 4,713,827, Cl. 375-7.000.

Neasham, David L.: *See—*
French, Steven J.; and Neasham, David L., 4,713,652, Cl. 340-652.000.

Nebon, Jean-Pierre: *See—*
Baginski, Pierre; and Nebon, Jean-Pierre, 4,713,508, Cl. 200-153.0SC.

NEC Corporation: *See—*
Araseki, Takashi, 4,713,776, Cl. 364-513.500.
Imamura, Toru, 4,713,357, Cl. 437-52.000.
Ishikawa, Takashi; Fukagawa, Hiroshi; and Matsui, Hiroyasu, 4,713,696, Cl. 358-261.000.
Kamo, Yuichi; and Mikami, Nobuo, 4,713,638, Cl. 335-79.000.
Mizota, Yasuhiro, 4,713,809, Cl. 370-97.000.
Oyagi, Takashi; and Tsunoda, Kazuyuki, 4,713,659, Cl. 340-825.440.
Suzuki, Takeshi, 4,713,836, Cl. 379-58.000.
Yamada, Kazuyoshi, 4,713,561, Cl. 307-456.000.

Necchi Societa per Azioni: *See—*
Bisson, Flavio, 4,712,494, Cl. 112-121.120.

Negi, Taichi: *See—*
Aoyama, Akimasa; Moritani, Takeshi; Yonezu, Kiyoshi; Negi, Taichi; and Okaya, Takuji, 4,713,296, Cl. 428-412.000.

Negishi, Kenji: *See—*
Oosaka, Sigenori; and Negishi, Kenji, 4,713,706, Cl. 360-104.000.

Negrutsky, Boris F.: *See—*
Negrutsky, Sergei B.; Klimov, Sergei B.; Negrutsky, Boris F.; and Churkin, Vladimir G., 4,712,772, Cl. 254-264.000.

Negrutsky, Sergei B.; Klimov, Sergei B.; Negrutsky, Boris F.; and Churkin, Vladimir G. Power hydraulic gear. 4,712,772, Cl. 254-264.000.

Nelson, David A., to Comlinear Corporation. Compensation and biasing of wideband amplifiers. 4,713,628, Cl. 330-254.000.

Nelson Industries, Inc.: *See—*
Iles, Lawrence F.; and Goplen, Gary D., 4,712,643, Cl. 181-231.000.

Nestec, S.A.: *See—*
Cazin, Pierre, 4,712,683, Cl. 206-478.000.

Neumann, Joachim: *See—*
Emmenthal, Klaus-Dieter; and Neumann, Joachim, 4,712,581, Cl. 137-561.00A.

Neuschutz, Dieter: *See—*
Bebber, Hans J.; Neuschutz, Dieter; and Rossner, Heinrich-Otto, 4,713,826, Cl. 373-22.000.

Nevamar Corporation: *See—*
Ungar, Israel S.; O'Neill, Nelson L.; Scher, Herbert I.; and O'Dell, Robin D., 4,713,138, Cl. 156-307.400.

New Holland Inc.: *See—*
Strong, Russell W.; and Rutt, Kenneth S., 4,712,568, Cl. 130-272.000.

New Ocean Wind Products, Inc.: *See—*
Oser, Richard B., 4,712,498, Cl. 114-39.200.

Newkirk, Marc S.; and Dizio, Steven F., to Lanxide Technology Company, LP. Novel ceramic materials and methods for making same. 4,713,360, Cl. 501-87.000.

Newman, Bruce A., to Conoco Inc. Premium coking process. 4,713,168, Cl. 208-131.000.

Newman, Wyatt S., to North American Philips Corporation. Helical spring holder assembly. 4,712,778, Cl. 267-170.000.

NGK Insulators, Ltd.: *See—*
Matsuhisa, Tadaaki; and Sasaki, Shingo, 4,713,206, Cl. 264-328.200.

NGK Spark Plug Co., Ltd.: *See—*
Kojima, Takao; and Ishiguro, Hiroyuki, 4,713,166, Cl. 204-425.000.

NI Industries, Inc.: *See—*
Nicol, Steven M., 4,712,845, Cl. 312-319.000.

Nichols, Edward W.: *See—*
Cross, Michael A.; and Nichols, Edward W., 4,712,914, Cl. 356-121.000.

Nicia, Antonius J. A., to U.S. Philips Corp. Geodesic optical component. 4,712,856, Cl. 350-96.120.

Nicol, Steven M., to NI Industries, Inc. Self-opening receptacle assembly with adjustable rollers. 4,712,845, Cl. 312-319.000.

Nield, Joseph G., Jr.: *See—*
Pejouhy, Radi; Nield, Joseph G., Jr.; D'Entremont, John R.; Beggs, Louis C.; and Rotulo, Fabrizio, 4,713,717, Cl. 361-26.000.

Nielsen, Richard H., to Phillips Petroleum Company. Fluid feed method. 4,713,169, Cl. 208-157.000.

Nieuwstad, Ronald L., to Peder Smedvig Aksjeselskap. Down-hole blow-out preventers. 4,712,613, Cl. 166-53.000.

Nihon Den-Netsu Keiki Co. Ltd.: *See—*
Kondo, Kenshi, 4,712,963, Cl. 414-222.000.

Niinomi, Masahiro: *See—*
Nishikawa, Yasuo; Okita, Tsutomu; Mukaida, Yoshito; Niinomi, Masahiro; Yanagihara, Kenji; and Kimura, Mituo, 4,713,287, Cl. 428-336.000.

Nikko Co., Ltd.: *See—*
Ishimoto, Zenichi, 4,713,499, Cl. 200-16.00D.

Nimbus Water Systems, Inc.: *See—*
Bray, Donald T., 4,713,175, Cl. 210-259.000.

Nippon Ester Co., Ltd.: *See—*
Tsujimoto, Keizo; Katagiri, Takashi; Ichihashi, Eiji; and Otsubo, Hitoshi, 4,712,366, Cl. 57-245.000.

Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha: *See—*
Hasegawa, Kenji; Sato, Tetsuo; and Iwanami, Teruo, 4,713,266, Cl. 427-412.500.

Nippon Hoso Kyokai: *See—*
Takayama, Shigehiko; Suzuki, Hitomi; Maruyama, Masanori; Fukushima, Masakazu; and Kurashige, Mitsuhiro, 4,713,588, Cl. 315-382.000.

Nippon Kogaku K.K.: *See—*
Sakato, Keiichiro, 4,712,910, Cl. 355-53.000.

Nippon Soda Co., Ltd.: *See—*
Ikura, Katsuyata; Hagiwara, Kenji; Nagasaki, Fumihiko; Yamada, Tomio; Takahashi, Hidemitsu; and Hatano, Renpei, 4,713,396, Cl. 514-594.000.

Nippon Steel Corporation: *See—*
Higuchi, Seizun; Oga, Tomonari; Ikeda, Masao; and Nakano, Hirohumi, 4,713,301, Cl. 428-628.000.

Nippondenso Co., Ltd.: *See—*
Abe, Tomoaki; Fujisawa, Hideya; Omori, Norio; Kinugawa, Masumi; Ito, Katsunori; Akiyama, Susumu; Mizuno, Tiaki; and Yamada, Toshitaka, 4,713,765, Cl. 364-431.050.
Yamada, Manabu; Yoshida, Ichirou; Yamaguchi, Shunzo; and Atsumi, Morihiro, 4,713,582, Cl. 315-58.000.

Nirvana Espar Systems S.A.: *See—*
Montandon, Daniel, 4,712,500, Cl. 114-90.000.

Nishida, Yukio: *See—*
Nomura, Etuzo; Sakakibara, Yasuo; Kozawa, Tetsuo; Nishida, Yukio; and Kondo, Ikuzo, 4,712,497, Cl. 112-315.000.

Nishikawa, Tooru: *See—*
Akiyama, Shigeru; Ueno, Hidetoshi; Imagawa, Koji; Kitahara, Akira; Nagata, Sumio; Morimoto, Kazuo; Nishikawa, Tooru; and Itoh, Masao, 4,713,277, Cl. 428-131.000.

Nishikawa, Toshio; and Tamura, Sadahiro, to Murata Manufacturing Co., Ltd. Band reflection type FET dielectric resonator oscillator. 4,713,632, Cl. 331-117.00D.

Nishikawa, Yasuo; Okita, Tsutomu; Mukaida, Yoshito; Niinomi, Masahiro; Yanagihara, Kenji; and Kimura, Mituo, to Fuji Photo Film Co., Ltd.; and Japan Synthetic Rubber Co., Ltd. Magnetic recording medium. 4,713,287, Cl. 428-336.000.

Nishimoto, Kanichi, to Noritsu Kenkyu Center Co., Ltd. Photosensitive material treating apparatus. 4,712,899, Cl. 354-316.000.

Nishimura, Sadahiko: *See—*
Makimoto, Toshio; Nishimura, Sadahiko; Matsuo, Masayuki; Abiko, Toshio; Ishizaki, Hirohumi; Kanda, Minoru; Nunoya, Hidetsugu; and Komatsu, Mikio, 4,713,670, Cl. 343-700.0MS.

Nishimura, Shigeru; and Kuroda, Toshihisa, to Matsushita Electric Industrial Co., Ltd. Video monitoring apparatus. 4,713,685, Cl. 358-103.000.

Nishiyama, Toshio: *See—*
Hirama, Shinichi; Nishiyama, Toshio; Ohta, Youichi; Uzuka, Makoto; Tomita, Kenichi; Nakajima, Keisuke; and Furuse, Kazumaro, 4,713,397, Cl. 514-690.000.

Niskanen, Don L., to Teleflex Incorporated. Parklock control. 4,712,397, Cl. 70-248.000.

Nissan Motor Co., Ltd.: *See—*
Nakamura, Makoto; Takahashi, Mitsuru; Osawa, Namieki; and Murakami, Yuichi, 4,713,044, Cl. 474-135.000.
Omori, Kiyoshi, 4,712,826, Cl. 296-93.000.
Taguchi, Hiromi, 4,712,708, Cl. 220-319.000.
Terasaka, Katsunori; Sunbuichi, Hiroshi; and Nakagawa, Toyoaki, 4,712,529, Cl. 123-492.000.
Ura, Syouzabu; Yasuda, Makoto; and Ooki, Yoshitaka, 4,712,532, Cl. 123-572.000.

Nissan Shatai Company, Limited: *See*—
Kamata, Mitsuo; and Yamashita, Yutaka, 4,712,446, Cl. 74-492.000.

Nissen, Harry S., to Danfoss A/S. Oil feeding apparatus for a rotary compressor. 4,712,986, Cl. 418-63.000.

Niwa, Masatake: *See*—
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 4,712,904, Cl. 354-475.000.

Niwa, Tomomitsu, to Mitsubishi Denki Kabushiki Kaisha. Numerically controlled machining method using primary and compensating cutters. 4,713,747, Cl. 364-170.000.

Nocci, Roberto: *See*—
Del Giudice, Luciano; Nocci, Roberto; Giannini, Umberto; and Gianotti, Giuseppe, 4,713,416, Cl. 525-68.000.

Noda, Kinzaburo: *See*—
Sakamoto, Teruo; Kawai, Sadao; Noda, Kinzaburo; Takeda, Toyohiko; and Kato, Hiroshi, 4,713,247, Cl. 424-461.000.

Noe, Joel M. Cutting instrument for nasal surgery which cuts parallel to its length. 4,712,546, Cl. 128-305.000.

Noel, Raymond; Robinson, William M.; Cherian, Gabe; Clifford, Thomas H.; Carlomagno, William D.; Deasy, William M.; Grassauer, Willie K.; Haygood, David K.; Sherlock, H. Paul; and White, Harry E., to Raychem Corp. Solder delivery systems. 4,712,721, Cl. 228-56.300.

Nomix Manufacturing Co. Limited: *See*—
Gill, David C., 4,712,738, Cl. 239-74.000.

Nomura, Etuzo; Sakakibara, Yasuo; Kozawa, Tetsuo; Nishida, Yukio; and Kondo, Ikuzo, to Brother Kogyo Kabushiki Kaisha. Sewing machine. 4,712,497, Cl. 112-315.000.

Nonomura, Arthur M., to Microbio Resources, Inc. Naturally-derived carotene/oil composition. 4,713,398, Cl. 514-725.000.

Nonomura, Masamitu: *See*—
Arakawa, Satoshi; and Nonomura, Masamitu, 4,713,549, Cl. 250-484.100.

Noonan, Joseph F.: *See*—
Raabe, Rodney D.; Mrowka, Joseph J.; McCuin, Jon P.; and Noonan, Joseph F., 4,713,728, Cl. 361-363.000.

Nordica S.p.A.: *See*—
Baggio, Giorgio, 4,712,316, Cl. 36-119.000.

Nordin, Lee. Crusher gap setting. 4,712,743, Cl. 241-30.000.

Norenberg, Hagen: *See*—
Herwig, Jens; Norenberg, Hagen; Bergmann, Friedhelm; Stiller, Manfred; Schlemmermeyer, Horst; Schmidt, Wilfried; Straube, Hilmar; and Wolter, Helmut, 4,712,434, Cl. 73-864.630.

Noritsu Kenkyu Center Co., Ltd.: *See*—
Nishimoto, Kanichi, 4,712,899, Cl. 354-316.000.

Noro, Masataka: *See*—
Yazaki, Takao; Noro, Masataka; and Matsui, Takashi, 4,713,282, Cl. 428-216.000.

Norrgren, Bo; and Bjelk, Nils, to Besam AB. Device for detecting objects, particularly such in motion. 4,713,545, Cl. 250-338.000.

Norsk Hydro, a.s.: *See*—
Kjohl, Olav; Obrestad, Torstein; and Groland, Hans, 4,713,108, Cl. 71-32.000.

North American Philips Consumer Electronics Corp.: *See*—
Josephs, Mark A., 4,713,578, Cl. 313-481.000.

North American Philips Corporation: *See*—
Newman, Wyatt S., 4,712,778, Cl. 267-170.000.

North American Specialties Corp.: *See*—
Seidler, Jack, 4,712,850, Cl. 439-861.000.

North, Henry. Apparatus for producing a force. 4,712,439, Cl. 74-84.00R.

North States Industries, Inc.: *See*—
Larson, Donald A., 4,712,773, Cl. 256-25.000.

Northern Telecom Limited: *See*—
Garner, John N., 4,712,368, Cl. 57-314.000.
Lukas, Helmut H.; and Pacey, Grant K., 4,712,861, Cl. 350-96.210.
Rosenbaum, Stanley D.; and Plett, Calvin, 4,713,838, Cl. 379-252.000.

Northrop Corporation: *See*—
Smith, Eugene A., 4,713,823, Cl. 372-90.000.

Norton, Gary E.: *See*—
Findlay, John B.; Wu, Annie L.; and Norton, Gary E., 4,713,327, Cl. 435-17.000.

Nose, Hiroyasu: *See*—
Baba, Takeshi; Imataki, Hiroyuki; Usui, Masayuki; Serizawa, Takashi; and Nose, Hiroyasu, 4,712,882, Cl. 350-413.000.

Novacco, Lawrence J.: *See*—
Farooque, Mohammad; and Novacco, Lawrence J., 4,713,303, Cl. 429-26.000.

Novatome: *See*—
Dumay, Jean-Jacques; and Malaval, Claude, 4,713,214, Cl. 376-312.000.

Novikova, Elizaveta B.: *See*—
Babaian, Eduard A.; Gerasimova, Galina A.; Davydov, Anatoly B.; Utyamyshev, Rustam I.; Khromov, Gennady L.; Metelitsa, Vladimir I.; Vikhert, Anatoly M.; Savvateev, Konstantin L.; Piotrovsky, Vladimir K.; and Novikova, Elizaveta B., 4,713,239, Cl. 424-81.000.

Nozato, Fujio. Ball throwing machine. 4,712,534, Cl. 124-78.000.

Nunning, Bernard C.: *See*—
Begum, Selima; Ullah, Ismat; and Nunning, Bernard C., 4,713,246, Cl. 424-455.000.

Nunokawa, Kazuo, to Tokyo Kogaku Kikai Kabushiki Kaisha. Ophthalmoscopic instrument having working position detecting means. 4,712,894, Cl. 351-208.000.

Nunoya, Hidetsugu: *See*—
Makimoto, Toshio; Nishimura, Sadahiko; Matsuo, Masayuki; Abiko, Toshio; Ishizaki, Hirohumi; Kanda, Minoru; Nunoya, Hidetsugu; and Komatsu, Mikio, 4,713,670, Cl. 343-700.0MS.

Nymark, Roald P., to Gerber Garment Technology, Inc. Restricting bracket for automatic transport system. 4,712,485, Cl. 104-172.400.

O&K Orenstein & Koppel Aktiengesellschaft: *See*—
Kirchhoff, Bernd; and Mecklenfeld, Hermann, 4,712,744, Cl. 241-80.000.

Obata, Minoru: *See*—
Ao, Hideki; Obata, Minoru; Yamanaka, Tsutomu; and Mikashima, Hiroshi, 4,713,381, Cl. 514-222.000.

Obeda, Edward G. Apparatus and method for ultrasonically joining sheets of termoplastic materials. 4,713,131, Cl. 156-73.100.

Oberlander, Lewis B.; Spicer, David A.; and Straubs, Ralph V., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Communication system control arrangement. 4,713,806, Cl. 370-58.000.

Oberoi, Bhushan K., to Redland Roof Tiles Limited. Collation assemblies. 4,712,361, Cl. 53-540.000.

Obrestad, Torstein: *See*—
Kjohl, Olav; Obrestad, Torstein; and Groland, Hans, 4,713,108, Cl. 71-32.000.

O'Brien, Michael J.: *See*—
Ramsey, Douglas P.; and O'Brien, Michael J., 4,712,704, Cl. 220-254.000.

Occidental Chemical Corporation: *See*—
Geering, Emil J.; and Grano, Frank J., 4,712,711, Cl. 220-457.000.

OCE-Nederland B.V.: *See*—
Giezeman, Paulus G.; and Romualdus Ter Horst, Gerhardus E., 4,713,674, Cl. 355-14.0SH.

Ochiai, Masanobu: *See*—
Ohta, Norio; Yanagishima, Fumiya; Kaihara, Toshikazu; Kishida, Akira; Sato, Kuniaki; and Ochiai, Masanobu, 4,713,154, Cl. 204-145.00R.

Oda, Yasuhiro: *See*—
Okuzono, Shuichi; Tanaka, Tetsuo; Oda, Yasuhiro; Shintani, Takashi; and Emura, Noriaki, 4,713,083, Cl. 8-557.000.

Odaka, Masanori: *See*—
Ogiue, Katsumi; Suzuki, Yukio; Masuda, Ikuro; Odaka, Masanori; and Uchida, Hideaki, 4,713,796, Cl. 365-189.000.

Oddenino, Manrico, to Illinois Tool Works Inc. Perfected cap, particularly for motor vehicles. 4,712,703, Cl. 220-210.000.

O'Dell, Robin D.: *See*—
Ungar, Israel S.; O'Neill, Nelson L.; Scher, Herbert I.; and O'Dell, Robin D., 4,713,138, Cl. 156-307.400.

Odorisio, Paul A.: *See*—
Spivack, John D.; Steinberg, David H.; and Odorisio, Paul A., 4,713,475, Cl. 560-75.000.

Oertel, Michael: *See*—
Weirich, Walter; Barnert, Heiko; Oertel, Michael; and Schulten, Rudolf, 4,713,234, Cl. 423-648.00R.

Oetiker, Hans. Earless clamp structure. 4,712,278, Cl. 24-20.0TT.

Offermann, Ludwig, to Carl Still GmbH & Co. KG, Firma. Light construction plug for coke oven doors. 4,713,148, Cl. 202-248.000.

Oga, Tomonari: *See*—
Higuchi, Seizun; Oga, Tomonari; Ikeda, Masao; and Nakano, Hirohumi, 4,713,301, Cl. 428-628.000.

Ogami, Takayuki: *See*—
Kasahara, Toshiharu; Ogami, Takayuki; and Kitayoshi, Hitoshi, 4,713,788, Cl. 364-718.000.

Ogawa, Takayuki; Ito, Hideaki; Kimura, Naokazu; Ito, Hayami; Tatsumi, Shuhei; Takao, Shoichi; Suzuki, Nitaro; Watanabe, Takashi; Shinano, Kunizo; Kuwabara, Takashi; and Aoki, Kaoru, to Electric Power Development Co., Ltd.; Kawasaki Jukogyo Kabushiki Kaisha; and Sumitomo Heavy Industries, Ltd. Preparation of deashed high solid concentration coal-water slurry. 4,712,742, Cl. 241-20.000.

Ogiue, Katsumi; Suzuki, Yukio; Masuda, Ikuro; Odaka, Masanori; and Uchida, Hideaki, to Hitachi, Ltd. Semiconductor integrated circuit. 4,713,796, Cl. 365-189.000.

Ohayon, Jacques J.; and Williams, Glen P., to Ohayon, Jacques J. Outpatient monitoring systems. 4,712,562, Cl. 128-672.000.

Ohbayashi, Keiji: *See*—
Nakamura, Shinichi; and Ohbayashi, Keiji, 4,713,317, Cl. 430-551.000.

Ohbuchi, Toru: *See*—
Nakayama, Tomobumi; Mori, Toshihiko; Hirose, Masayuki; Ohbuchi, Toru; Miyata, Masanori; Nakamura, Shinichi; and Honjo, Takeshi, 4,712,908, Cl. 355-14.0SH.

Ohga, Shinji: *See*—
Hatakeyama, Takuya; and Ohga, Shinji, 4,713,024, Cl. 439-555.000.

Ohgita, Kazuyuki: *See*—
Anzai, Shunju; Sasaki, Hiromu; Kunikawa, Norihide; and Ohgita, Kazuyuki, 4,713,550, Cl. 250-560.000.

Ohio State University Research Foundation, The: *See*—
Stevens, Vernon C., 4,713,366, Cl. 514-13.000.

Ohkawa, Shuji: *See*—
Nakamura, Hiro; Ohkawa, Shuji; Ohtsuka, Yasuo; Tachikawa, Hajime; and Shinozaki, Toshiya, 4,712,970, Cl. 414-730.000.

Ohnishi, Tadakazu: *See*—
Higashi, Kenji; Ohnishi, Tadakazu; and Tsukuda, Ichizo, 4,713,216, Cl. 420-532.000.

Ohno, Hirotoshi, to Victor Company of Japan. Control circuit for DC brushless motor producing constant output torque. 4,713,590, Cl. 318-254.000.

Ohno, Kiyoshi: *See*—
Ozaki, Haruhiko; Yamada, Tadatoshi; Machida, Kunio; Ohno, Kiyoshi; Shimazaki, Hirato; Inoue, Hidekimi; and Uji, Ryohei, 4,713,686, Cl. 358-107.000.

Ohno, Sachio; Ebihara, Yuko; Mizukoshi, Kiyoshi; Ichihara, Kenji; Ban, Takao; and Nagasaka, Mitsuaki, to Maruko Seiyaku Co., Ltd. Ergoline derivatives and acid addition salts thereof. 4,713,457, Cl. 546-67.000.

Ohno, Yasunori; Kurosawa, Tomoe; Sato, Tadashi; Kurosawa, Yukio; and Hakamata, Yoshimi, to Hitachi, Ltd. Ion source. 4,713,585, Cl. 315-111.810.

Ohodaira, Osamu: *See*—
Wakisaka, Yoshiharu; Uo, Junko; Matsumoto, Kouichi; Ohodaira, Osamu; and Tanaka, Kentaro, 4,713,241, Cl. 424-93.000.

Ohshima, Keiichi, to Seiko Epson Corporation. Color printer including a multiple color ink ribbon cartridge and tensioning device. 4,712,931, Cl. 400-196.100.

Ohta, Masaki: *See*—
Inagaki, Mitukane; Ohta, Masaki; Hyodo, Akihiko; Takenaka, Kenji; Mitibata, Takashi; Suzuki, Shinichi; and Kayukawa, Hiroaki, 4,712,982, Cl. 417-222.000.

Ohta, Norio; Yanagishima, Fumiya; Kaihara, Toshikazu; Kishida, Akira; Sato, Kuniaki; and Ochiai, Masanobu, to Kawasaki Steel Corporation. Continuous annealing and pickling method and apparatus for steel strips. 4,713,154, Cl. 204-145.00R.

Ohta, Youichi: *See*—
Hirama, Shinichi; Nishiyama, Toshio; Ohta, Youichi; Uzuka, Makoto; Tomita, Kenichi; Nakajima, Keisuke; and Furuse, Kazumaro, 4,713,397, Cl. 514-690.000.

Ohtaguro, Masami: *See*—
Ando, Shinji; Ohtaguro, Masami; Masuda, Takayoshi; and Watanabe, Yoshimoto, 4,713,245, Cl. 424-438.000.

Ohtaka, Keiji, to Canon Kabushiki Kaisha. Sharp focus detecting device. 4,712,901, Cl. 354-407.000.

Ohtsuka, Yasuo: *See*—
Nakamura, Hiro; Ohkawa, Shuji; Ohtsuka, Yasuo; Tachikawa, Hajime; and Shinozaki, Toshiya, 4,712,970, Cl. 414-730.000.

Oikawa, Saburo: *See*—
Terasawa, Yoshio; and Oikawa, Saburo, 4,713,679, Cl. 357-38.000.

Oikawa, Shoji; Yamagishi, Hiroshi; Saito, Shigeru; Fujita, Tsuyoshi; and Watanabe, Takayoshi, to Hitachi, Ltd. Multilayer ceramic circuit board. 4,713,494, Cl. 174-68.500.

Ojala, William: *See*—
Robinson, Donald L.; and Ojala, William, 4,712,870, Cl. 350-243.000.

Okabe, Yoshio: *See*—
Kodama, Hisashi; and Okabe, Yoshio, 4,713,045, Cl. 474-135.000.

Okada, Hisashi: *See*—
Kubodera, Seiiti; Ukai, Toshinao; and Okada, Hisashi, 4,713,316, Cl. 430-351.000.

Okada, Shinjiro; Kanbe, Junichiro; Tsuboyama, Akira; and Inaba, Yutaka, to Canon Kabushiki Kaisha. Ferroelectric display panel of varying thickness and driving method therefor. 4,712,877, Cl. 350-350.00S.

Okada, Shinjiro: *See*—
Kanbe, Junichiro; and Okada, Shinjiro, 4,712,873, Cl. 350-337.000.
Taniguchi, Osamu; Okada, Shinjiro; and Ando, Yujiro, 4,712,878, Cl. 350-350.00S.

Okada, Wataru: *See*—
Nakashima, Toshimitsu; Okada, Wataru; and Mitani, Toragoro, 4,713,443, Cl. 528-499.000.

Okamoto, Kyoichi: *See*—
Morishita, Akira; Okamoto, Kyoichi; Nakagawa, Taiichi; Morikane, Hiroyuki; Hasegawa, Akinori; Arima, Takemi; and Kounou, Tadami, 4,712,451, Cl. 74-801.000.

Okamoto, Masayoshi; Suzuki, Katsuhisa; Hoshino, Ryoichi; and Sasaki, Hironaka, to Showa Aluminum Kabushiki Kaisha. Horizontal stack type evaporator. 4,712,612, Cl. 165-146.000.

Okawa, Hiroshi: *See*—
Saito, Koji; and Okawa, Hiroshi, 4,713,633, Cl. 333-222.000.

Okaya, Takuji: *See*—
Aoyama, Akimasa; Moritani, Takeshi; Yonezu, Kiyoshi; Negi, Taichi; and Okaya, Takuji, 4,713,296, Cl. 428-412.000.

Okazaki, Toru: *See*—
Wakasa, Satoshi; and Okazaki, Toru, 4,712,985, Cl. 417-486.000.

Oki Electric Industry Co., Ltd.: *See*—
Egawa, Takashi; and Sano, Yoshiaki, 4,713,354, Cl. 437-22.000.

Okita, Tsutomu: *See*—
Nishikawa, Yasuo; Okita, Tsutomu; Mukaida, Yoshito; Niinomi, Masahiro; Yanagihara, Kenji; and Kimura, Mituo, 4,713,287, Cl. 428-336.000.

Okuzono, Shuichi; Tanaka, Tetsuo; Oda, Yasuhiro; Shintani, Takashi; and Emura, Noriaki, to Toyo Soda Manufacturing Co., Ltd. Alcoholic solution of sulphonic acid-containing copolymer dyed with basic dye. 4,713,083, Cl. 8-557.000.

Old, Lloyd J.: *See*—
Bander, Neil H.; Whitmore, Willet F.; and Old, Lloyd J., 4,713,352, Cl. 436-548.000.

Olson, Robert K.: *See*—
Reno, Mark E.; Olson, Robert K.; and Kalnes, Tom N., 4,713,167, Cl. 208-59.000.

Olympus Optical Co., Ltd.: *See*—
Fujimori, Hiroyoshi; and Nagasaki, Tatsuo, 4,713,683, Cl. 358-42.000.
Hakamatsuka, Yasuharu; and Yokoyama, Nobuyuki, 4,713,006, Cl. 433-201.100.
Yoshikawa, Shozi, 4,713,819, Cl. 372-9.000.

Omatsu, Masayuki; Yonese, Naoki; and Kondo, Mitsuru, to Kanzaki Paper Manufacturing Co., Ltd. Method for producing cycloalkyl aminophenol derivatives. 4,713,488, Cl. 564-397.000.

OMCO, Inc.: *See*—
Agbay, Anthony J., 4,712,395, Cl. 70-34.000.

Omori, Kiyoshi, to Nissan Motor Co., Ltd. Automotive window and molding assembly having a device for mounting a corner joint. 4,712,826, Cl. 296-93.000.

Omori, Norio: *See*—
Abe, Tomoaki; Fujisawa, Hideya; Omori, Norio; Kinugawa, Masumi; Ito, Katsunori; Akiyama, Susumu; Mizuno, Tiaki; and Yamada, Toshitaka, 4,713,765, Cl. 364-431.050.

Omron Tateisi Electronics Co.: *See*—
Mikami, Kazuo; Yamashita, Tsukasa; and Katoh, Mitsutaka, 4,712,854, Cl. 350-96.120.
Ueda, Kenji, 4,713,602, Cl. 323-354.000.
Yamada, Kazutoshi; and Yamaguchi, Takao, 4,713,760, Cl. 364-405.000.

O'Neill, Nelson L.: *See*—
Ungar, Israel S.; O'Neill, Nelson L.; Scher, Herbert I.; and O'Dell, Robin D., 4,713,138, Cl. 156-307.400.

Ono, Satoshi: *See*—
Watanabe, Isao; Momonoi, Kaishu; Hiraiwa, Toru; Ono, Satoshi; Nakano, Joji; Nagumo, Katsuyuki; and Takagi, Hiroyasu, 4,713,387, Cl. 514-332.000.

Ono, Taizo: *See*—
Yokoyama, Kazumasa; Fukaya, Chikara; Tsuda, Yoshio; Ono, Taizo; Arakawa, Yoshio; and Suyama, Tadakazu, 4,713,459, Cl. 546-150.000.

Onoue, Hiroshi; and Takahashi, Hiromi, to Shionogi & Co., Ltd. Process for producing glutaconic acid derivatives. 4,713,461, Cl. 548-194.000.

Onozawa, Motohisa: *See*—
Ishii, Yugoro; Onozawa, Motohisa; and Katamine, Akihiko, 4,712,428, Cl. 73-644.000.

Ontario Cancer Institute, The: *See*—
Mak, Tak W., 4,713,332, Cl. 435-70.000.

Ooishi, Kazuya: *See*—
Umeda, Takao; Ooishi, Kazuya; Igawa, Tatsuo; and Hori, Yasuro, 4,712,876, Cl. 350-350.00S.

Ooki, Yoshitaka: *See*—
Ura, Syouzabu; Yasuda, Makoto; and Ooki, Yoshitaka, 4,712,532, Cl. 123-572.000.

Oonaka, Hidemi: *See*—
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Opprecht, Paul; Urech, Werner; and Opprecht, Jurg, to Elpatronic AG. Openable can body. 4,712,960, Cl. 413-74.000.

Orbital Engine Company Proprietary Limited: *See*—
Smith, Darren A.; and Thompson, Ian R., 4,712,524, Cl. 123-198.00A.

Orndorff, Karl B.: *See*—
Sherwood, Edward F.; and Orndorff, Karl B., 4,712,651, Cl. 187-1.00R.

Ortho Pharmaceutical Corporation: *See*—
Pascone, John M., 4,713,480, Cl. 560-157.000.

Orvik, Jon A.: *See*—
DesJardin, Michael A.; Dietsche, Thomas J.; and Orvik, Jon A., 4,713,460, Cl. 546-345.000.

Osawa, Namieki: *See*—
Nakamura, Makoto; Takahashi, Mitsuru; Osawa, Namieki; and Murakami, Yuichi, 4,713,044, Cl. 474-135.000.

Osborne, Anthony, to Kearney-National, Inc. Electric bypass switch. 4,713,500, Cl. 200-48.0KB.

Oscar Mayer Foods Corporation: *See*—
Mally, Timothy G., 4,712,458, Cl. 83-86.000.

Oser, Richard B., to New Ocean Wind Products, Inc. Multiple support bar for manipulation of a hand-held sail assembly. 4,712,498, Cl. 114-39.200.

Oshikoshi, Yuji, to Fuji Photo Film Co., Ltd. CRT composite image printing method and apparatus. 4,712,909, Cl. 355-20.000.

Oshimi, Tetsuro: *See*—
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Osinga, Halbe: *See*—
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Osseyran, Anwar; Van De Meerakker, Jacobus J. M.; Van Der Meulen, Harmen; and Osinga, Halbe, to U.S. Philips Corporation. Electromagnetic deflection unit. 4,713,641, Cl. 335-213.000.

Ossowski, Richard: *See*—
Antonelli, Douglas C.; Branscomb, Patricia M.; Broockman, Eric C.; Dickson, LeRoy D.; Koppel, Caralee P.; Ossowski, Richard; and Stokes, Olen L., Jr., 4,713,785, Cl. 364-569.000.

Osterloh, Rolf; Schupp, Eberhard; Loch, Werner; and Ahlers, Klaas, to BASF Aktiengesellschaft. Urea/polyamine/secondary monoamine/-polyalcohol condensate. 4,713,440, Cl. 528-367.000.

Osterloh, Rolf: *See*—
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Ostoich, Vladimir E.: *See—*
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Otsuka Kagaku Kabushiki Kaisha: *See—*
Torii, Sigeru; Tanaka, Hideo; Sasaoka, Michio; Uto, Seiryu; and Hayase, Syozo, 4,713,452, Cl. 540-358.000.

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Nakashima, Seiichiro; Toyoda, Kenichi; Inagaki, Shigemi; and Otsuka, Kazuhisa, 4,712,972, Cl. 414-744.00R.

Otsuki, Akihiro: *See—*
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Otto, Jurgen: *See—*
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Ou, Jung-Hsing: *See—*
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Losapio, Peter F.; Germer, Warren R.; Ouellette, Maurice J.; and Palmer, Ansell W., 4,713,609, Cl. 324-156.000.

Overall, Colin D.: *See—*
Knapp, Alan G.; Overall, Colin D.; and Slater, Richard A. M., 4,713,575, Cl. 313-400.000.

Overbury, Francis G.; Ward, Christopher R.; and Searle, Jeffrey G., to STC plc. Adaptive antenna. 4,713,668, Cl. 342-384.000.

Ovshinsky, Stanford R., to Energy Conversion Devices, Inc. Power generating optical filter. 4,713,493, Cl. 136-249.000.

Owen, Barry C.: *See—*
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Owen, David O.; and Connelly, Lawrence J., to Nalco Chemical Company. Iron removal from bayer process liquor. 4,713,222, Cl. 423-122.000.

Owens-Corning Fiberglas Corporation: *See—*
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Owens-Illinois Closure Inc.: *See—*
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Owens-Illinois Glass Container Inc.: *See—*
Keyes, Melvin H., 4,713,335, Cl. 435-183.000.

Owens-Illinois Plastic Products Inc.: *See—*
Jabarin, Saleh A.; and Ajmera, Prakash R., 4,713,269, Cl. 428-35.000.
Jabarin, Saleh A.; and Ajmera, Prakash R., 4,713,270, Cl. 428-35.000.
Panazzolo, Aldo, 4,712,680, Cl. 206-427.000.

Oxley, Lonnie R., to Deere & Company. Quick attachable and detachable mower blade assembly. 4,712,364, Cl. 56-295.000.

Oy Nokia AB: *See—*
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Oy Tampella AB: *See—*
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Oy Wartsila Ab: *See—*
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Oyagi, Takashi; and Tsunoda, Kazuyuki, to NEC Corporation. Pager with display. 4,713,659, Cl. 340-825.440.

Ozaki, Haruhiko; Yamada, Tadatoshi; Machida, Kunio; Ohno, Kiyoshi; Shimazaki, Hirato; Inoue, Hidekimi; and Uji, Ryohei, to Bridgestone Corporation. High speed instantaneous multi-image recorder. 4,713,686, Cl. 358-107.000.

P.G.L. Industries, Inc.: *See—*
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Pacesetter Infusion, Ltd.: *See—*
Pelmulder, John P.; Gorton, Lanny A.; Guleserian, Armen J.; and Livingston, John H., 4,712,583, Cl. 137-852.000.

Pacey, Grant K.: *See—*
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Pacific Scientific Co.: *See—*
Mastromattei, Robert, 4,713,570, Cl. 310-154.000.

Padgett, Bobby R. Fishhook and lure retrieving device. 4,712,324, Cl. 43-17.200.

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Chiang, Peter K.; Richard, Michelle M.; Padilla, Felipe N.; Carroll, Frank I.; and Abraham, Philip, 4,713,391, Cl. 514-412.000.

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Paek, Un-Chul: *See—*
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Page, Lawrence J. Lineman's safety strap assembly. 4,712,646, Cl. 182-9.000.

Palac, Kazimir: *See—*
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Palloch, Herbert: *See—*
Erndt, Hans; Link, Erich; Martin, Adolf; Palloch, Herbert; and Wittler, Hilmar, 4,712,660, Cl. 192-18.00B.

Palmer, Ansell W.: *See—*
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Palmer, Gary E., to Hako Minuteman, Inc. Brake drum encapsulator. 4,712,270, Cl. 15-345.000.

Palmer, Robert S.: *See—*
Garin, John; Riggs, Allan J.; and Palmer, Robert S., 4,712,973, Cl. 414-744.00A.

Panazzolo, Aldo, to Owens-Illinois Plastic Products Inc. Reinforced self-centering plastic carrier for bottles. 4,712,680, Cl. 206-427.000.

Pangburn, William E., to Haefliger, William W., a part interest. Cushioned abrasive composite. 4,712,552, Cl. 128-355.000.

Pappas, Barbara: *See—*
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Paramount Packaging Corp.: *See—*
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Pareja, Ramon, to Lear Siegler, Inc. Surge suppressor. 4,712,584, Cl. 138-30.000.

Parish, David M.: *See—*
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Park, Daniel J.: *See—*
Gaskill, Garold B.; Park, Daniel J.; Rullman, Robert G.; Rose, Donald T.; Stiley, Joseph F., III; Barnum, Lewis W.; and Hoff, Don G., 4,713,808, Cl. 370-94.000.

Parker Chemical Company: *See—*
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Parker Pen Ltd.: *See—*
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Parsley, David W., to Sperry Corporation. Dual-inductor buck switching converter. 4,713,742, Cl. 363-124.000.

Pas, Ireneus J. T. M.: *See—*
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Pascal, Jean-Claude, to Syntex (U.S.A.) Inc. N-phenyl-4-phenyl-1-piperazinecarboxamidines and related compounds as antiarrhythmic agents. 4,713,382, Cl. 514-255.000.

Pascone, John M., to Ortho Pharmaceutical Corporation. Method for the production of crystalline amino-protected-beta-benzyl-L-aspartic acid. 4,713,480, Cl. 560-157.000.

Pasquali, Renato: *See—*
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Pasquin, John. Crank case compressor unit for a two cycle engine. 4,712,520, Cl. 123-73.00S.

Passerell, David P.; and Rogge, Danny G., to Perfection Corporation. Coupling apparatus. 4,712,813, Cl. 285-250.000.

Patel, Arvind D.; and Salandanan, Carmelita, to Dresser Industries, Inc. Oil based drilling fluid reversion. 4,713,183, Cl. 252-8.515.

Paterson, James L.: *See—*
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Tigelaar, Howard L.; Riemenschnschneider, Bert R.; and Paterson, James L., 4,713,677, Cl. 357-23.500.

Patrin, Raymond A. Girocycle. 4,712,806, Cl. 280-217.000.

Paul Hettich GmbH & Co.: *See—*
Sundermeier, Gunter, 4,712,271, Cl. 16-238.000.

Paul, Richard J.: *See—*
Anderson, George C.; and Paul, Richard J., 4,712,329, Cl. 47-84.000.

Pavely, Andrew P., to Metal Box p.l.c. Closure for a container. 4,712,707, Cl. 220-307.000.

Paz de Araujo, Carlos: *See—*
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Pearce, Sarah L.: *See—*
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Peder Smedvig Aksjeselskap: *See—*
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Peele, Camille; Harwood, Jon W.; and Resuggan, Peter L., to AP Industries, Inc. Clamp apparatus. 4,712,295, Cl. 29-700.000.

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Peglow, James D.: *See—*
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Peifer, Ralph D. Grain drying apparatus for storage bin. 4,712,311, Cl. 34-56.000.

Peinsipp, Alice A., to Selfix, Inc. Stowable shelf/rack assembly. 4,712,692, Cl. 211-119.000.

Pejouhy, Radi; Nield, Joseph G., Jr.; D'Entremont, John R.; Beggs, Louis C.; and Rotulo, Fabrizio, to Texas Instruments. Protected refrigerator compressor motor systems and motor protectors. 4,713,717, Cl. 361-26.000.

Pelmulder, John P.; Gorton, Lanny A.; Guleserian, Armen J.; and Livingston, John H., to Pacesetter Infusion, Ltd. Precision passive flat-top valve for medication infusion system. 4,712,583, Cl. 137-852.000.

Pelonis, Kosta, to Doric Electronic Laboratories Ltd. Lighting fixture overload protector. 4,713,721, Cl. 361-100.000.

Pelt & Hooykaas B.V.: *See—*
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Pelzl, Leo: *See—*
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Pender, Daniel J. Apparatus for treating recurrent ear infections. 4,712,537, Cl. 128-9.000.
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Penisson, Dennis J.: *See—*
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Penn Plax Plastics, Inc.: *See—*
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Pennanen, Risto; and Pennala, Jyrki, to Oy Nokia AB. Method of and a device for applying a primary coating to an optical filament. 4,713,103, Cl. 65-3.110.
Pensenstadler, David F.: *See—*
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Pepper, Steven H., to Tektronix, Inc. Current sensing circuit. 4,713,607, Cl. 324-73.0PC.
Peppiatt, Harry R., to Paramount Packaging Corp. Resealable reusable flexible plastic bag with loop handle. 4,713,839, Cl. 383-29.000.
Percivalle, Glenn S.; and Blanchette, Ronald L., to Kenney Manufacturing Company. Apparatus and method for cutting window shades. 4,712,457, Cl. 82-47.000.
Pereillo, Jean-Marie: *See—*
Bayol, Alain; Blanc, Francis; Lansen, Jacqueline; Maffrand, Jean-Pierre; and Pereillo, Jean-Marie, 4,713,373, Cl. 514-54.000.
Perfection Corporation: *See—*
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Perrott, Charles H., to C. H. Perrott, Inc. Vacuum-breaking valve for pressurized fluid lines. 4,712,574, Cl. 137-217.000.
Perry, Peter J.: *See—*
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Pesapane, Dominic, to Casco Products Corporation. Electrical power receptacle. 4,713,017, Cl. 439-142.000.
Pesapane, Dominic: *See—*
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Peschl, Heinz-Walter: *See—*
Spilker, Harry; Rox, Rainer; and Peschl, Heinz-Walter, 4,713,199, Cl. 252-633.000.
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Peters, Rex B., to Sundstrand Data Control, Inc. Vibrating beam accelerometer with velocity change output. 4,712,427, Cl. 73-517.0AV.
Peters, Ronald: *See—*
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Peters, Rudolph; Peters, Ronald; and Taylor, William, to Edward Weck & Co. Automatic hemostatic clip applier. 4,712,549, Cl. 128-325.000.
Petersen, Wayne E.: *See—*
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Phelan, James J., to Deere & Company. Ground speed sensor. 4,713,665, Cl. 342-104.000.
Phelan, James J.; and Ferguson, Larry W., to Deere & Company. Ultrasonic horn with sidelobe suppressing centerpiece. 4,713,799, Cl. 367-140.000.
Phillips Petroleum Company: *See—*
Brown, Ronald E., 4,713,424, Cl. 585-424.000.
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Montgomery, Dean P.; Gall, James W.; and Davis, Ed D., 4,713,221, Cl. 422-190.000.
Nielsen, Richard H., 4,713,169, Cl. 208-157.000.
Photoflex Products: *See—*
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Piacentino, Renato. Implant device for the surgical treatment of infertility due to obstruction of uterine tubes. 4,713,074, Cl. 623-12.000.
Pickering-Johnson, Sharon A.: *See—*
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Pickett, Gordon E.: *See—*
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Pilz, Georg; Buerger, Gert; Barl, Manfred; and Thiel, Gerhard, to BASF Aktiengesellschaft. Process for the preparation of salts of a dicarboxylic acid and a diamine. 4,713,201, Cl. 260-501.170.
Pilz, Georg; Buerger, Gert; Barl, Manfred; and Thiel, Gerhard, to BASF Aktiengesellschaft. Salt of oxaalkylenediamine with dicarboxylic acid, containing hydrazine, preparation, and nylon prepared therefrom. 4,713,437, Cl. 528-336.000.
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Marcusse, Alain; and Pinel, Max, 4,712,337, Cl. 52-90.000.
Pinsky, Naum; and Alkaitis, Saulius A., to Ensci, Inc. Battery element and battery incorporating doped tin oxide coated substrate. 4,713,306, Cl. 429-218.000.
Pioneer Electronic Corporation: *See—*
Hasegawa, Yonosuke, 4,713,840, Cl. 455-2.000.
Piotrovsky, Vladimir K.: *See—*
Babaian, Eduard A.; Gerasimova, Galina A.; Davydov, Anatoly B.; Utyamyshev, Rustam I.; Khromov, Gennady L.; Metelitsa, Vladimir I.; Vikhert, Anatoly M.; Savvateev, Konstantin L.; Piotrovsky, Vladimir K.; and Novikova, Elizaveta B., 4,713,239, Cl. 424-81.000.
Piper, Francis R.: *See—*
Bray, David J.; and Piper, Francis R., 4,712,736, Cl. 239-11.000.
Pitney Bowes Inc.: *See—*
Hills, Karen F.; and Jones, Howell A., 4,713,769, Cl. 364-464.000.
Sharpe, Murem S.; Bryson, Eugene; Manduley, Flavio; Riordan, Eben M., II; and Flesser, Brian D., 4,713,761, Cl. 364-406.000.
PKL Papier-und Kunststoff-Werke Linnich GmbH: *See—*
Stohr, Benno, 4,712,690, Cl. 206-628.000.
Plaisance, Thomas H.: *See—*
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Plastics, Inc.: *See—*
Colato, Albert E., 4,713,513, Cl. 219-10.55F.
Plett, Calvin: *See—*
Rosenbaum, Stanley D.; and Plett, Calvin, 4,713,838, Cl. 379-252.000.
Plumier, Michel, to Ateliers de Constructions Electriques de Charleroi. Process for surveillance and control of operations of loading and unloading of the fuel of a nuclear reactor and apparatus applying this process. 4,713,212, Cl. 376-258.000.
Podgorski, Theodore J.: *See—*
Bergstrom, James W.; and Podgorski, Theodore J., 4,712,917, Cl. 356-350.000.
Poetsch, Eike: *See—*
Eidenschink, Rudolf; Krause, Joachim; Hittich, Reinhard; Poetsch, Eike; Scheuble, Bernhard; Weber, Georg; and Pohl, Ludwig, 4,713,197, Cl. 252-299.610.
Praefcke, Klaus; Kohne, Bernd; Poetsch, Eike; and Herz, Claus P., 4,713,196, Cl. 252-299.010.
Pohl, Ludwig: *See—*
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Poirier, J. Leon; and McGahan, Robert V., to United States of America, Air Force. Target support apparatus. 4,713,667, Cl. 342-192.000.
Polaroid Corporation: *See—*
Bartels-Keith, James R., deceased; Puttick, Anthony J.; and Taylor, Lloyd D., 4,713,313, Cl. 430-251.000.
Kane, Peter E., 4,712,974, Cl. 414-757.000.
Polaschegg, Hans-Dietrich, to Fresenius AG. Apparatus for removing water from blood. 4,713,171, Cl. 210-110.000.
Polifarma S.p.A.: *See—*
Sisto, Alessandro; Verdini, Antonio S.; Virdia, Antonino; De Luca, Giovanna; Di Stazio, Giovanni; and Politi, Vincenzo, 4,713,368, Cl. 514-18.000.

Politi, Vincenzo: *See*—
Sisto, Alessandro; Verdini, Antonio S.; Virdia, Antonino; De Luca, Giovanna; Di Stazio, Giovanni; and Politi, Vincenzo, 4,713,368, Cl. 514-18.000.

Polyplastics Co., Ltd.: *See*—
Takahashi, Katsuhiko; and Tajima, Yoshihisa, 4,713,408, Cl. 524-161.000.

Polysar Limited: *See*—
Kent, Eric G., 4,713,133, Cl. 156-162.000.

Pomagalski S.A.: *See*—
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Ponomareva, Natalya A.: *See*—
Arutjunian, Norair S.; Kornena, Elena P.; Kazarian, Robert V.; Ponomareva, Natalya A.; Redko, Grigory V.; Sakhno, Lidia T.; and Zhidkova, Irina S., 4,713,155, Cl. 204-155.000.

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Chaveron, Henri; Pontillon, Jean; Billon, Michel; Adenier, Herve ; and Kamoun, Ahmed, 4,713,256, Cl. 426-631.000.

Poore, John W.: *See*—
Thornander, Hans T.; Poore, John W.; Sholder, Jason A.; Thacker, James R.; and Amundson, David C., 4,712,555, Cl. 128-419.0PG.

Pope, Louis M.: *See*—
Bunting, John A.; Pope, Louis M.; and Clark, James L., 4,713,286, Cl. 428-323.000.

Pope, Urban. Tool for lifting doors and panels. 4,712,819, Cl. 294-92.000.

Poplawski, Judith A.; and Andersen, David J., to Color Arts, Inc. Portable device for modeling vehicle graphics. 4,713,012, Cl. 434-373.000.

Porter, David R.; Bowen, James H.; and Holland, John M., to ITT Electro Optical Products, a division of ITT Corporation. Synchronous, asynchronous, data rate transparent fiber optic communications link. 4,713,841, Cl. 455-608.000.

Poupaert, Jacques: *See*—
Dumont, Pierre; and Poupaert, Jacques, 4,713,390, Cl. 514-389.000.

Poux, Jean P., to Thomson-CSF. Method of processing the sum and difference signals of a radar of the monopulse type for estimating the parasite phase introduced between these signals by the ultrahigh frequency formation circuits of the sum and difference channels. 4,713,666, Cl. 342-152.000.

Pow-R Tools Corporation: *See*—
Adams, Joseph S.; and Branston, Paul G., 4,712,379, Cl. 60-632.000.

Powercube Corporation: *See*—
Henderson, Ross, 4,713,554, Cl. 307-64.000.

Powerplex Technologies, Inc.: *See*—
Altmejd, Morrie, 4,713,597, Cl. 320-13.000.

Pozzi, Gian C. Quick action self-locking pipe fittings. 4,712,810, Cl. 285-93.000.

Praefcke, Klaus; Kohne, Bernd; Poetsch, Eike; and Herz, Claus P., to Merck Patent Gesellschaft mit beschrankter Haftung. Polymer compositions exhibiting liquid-crystalline phases. 4,713,196, Cl. 252-299.010.

Pratt, J. Richard: *See*—
St. Clair, Terry L.; Maudgal, Shubha; and Pratt, J. Richard, 4,713,439, Cl. 528-353.000.

Presto, Mario. Golf putter. 4,712,798, Cl. 273-164.000.

Precorp, Inc.: *See*—
Bunting, John A.; Pope, Louis M.; and Clark, James L., 4,713,286, Cl. 428-323.000.

Premier Brands U.K. Limited: *See*—
Rimmer, James R.; and Sweeney, Ronald M., 4,712,358, Cl. 53-450.000.

Presby, Herman M., to American Telephone and Telegraph Company, AT&T Bell Labratories. Lightguide access port. 4,712,858, Cl. 350-96.150.

Prescolite Inc.: *See*—
Lasker, Martin L.; and Cohen, Joel S., 4,713,737, Cl. 362-285.000.

Presser, Dwight W.; and Berke, Joseph J., to Berke, Joseph J. Dental mirror. 4,713,002, Cl. 433-30.000.

Prevorsek, Dusan C.: *See*—
Kwon, Young D.; Kavesh, Sheldon; and Prevorsek, Dusan C., 4,713,290, Cl. 428-364.000.

Price, Macy J.; Johnson, Mack E.; and Acker, Norman J., to Engineered Data Products, Inc. Movable computer work processing system. 4,712,842, Cl. 312-196.000.

Prier, Donald G.: *See*—
Webb, Daniel D.; and Prier, Donald G., 4,713,399, Cl. 521-110.000.

Priest, Mark A.: *See*—
Handke, Wayne A.; and Priest, Mark A., 4,712,618, Cl. 166-308.000.

Princiotta, Raymond A., Sr.; and Salvucci, Antonio. Stacking apparatus. 4,712,787, Cl. 271-311.000.

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Gosselink, Eugene P., 4,713,194, Cl. 252-174.230.
Letton, James C., 4,713,447, Cl. 536-18.600.

Proksch, Georg: *See*—
Berchem, Rutger; and Proksch, Georg, 4,712,321, Cl. 37-142.00R.

Pronto Service Facilities, Inc.: *See*—
Campbell, David L., 4,712,650, Cl. 186-41.000.

Pronzinski, Catherine. Neonatal blanket. 4,712,263, Cl. 5-508.000.

Pross, Elke B.: *See*—
Tolksdorf, Wolfgang F. M.; Bartels, Inske E. H.; Dammann, Hans O. B.; Klages, Claus-Peter; and Pross, Elke B., 4,712,855, Cl. 350-96.120.

Protectaire Systems Co.: *See*—
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Prucher, Helmut: *See*—
Kramer, Josef; Irmscher, Klaus; Prucher, Helmut; and Hesch, Rolf-Dieter, 4,713,465, Cl. 549-403.000.

Puntous, Rene : *See*—
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Puttick, Anthony J.: *See*—
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Pyka, Hans-Jurgen: *See*—
Forster, Rudolf; Weber, Suso; and Pyka, Hans-Jurgen, 4,713,353, Cl. 437-2.000.

Qiayu, Zheng: *See*—
Xu-Yi, Zhang; Guangxi, Yue; and Qiayu, Zheng, 4,712,514, Cl. 122-4.00D.

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Xu-Yi, Zhang; Guangxi, Yue; and Qiayu, Zheng, 4,712,514, Cl. 122-4.00D.

Quaker Industries, Inc.: *See*—
Fry, John A., 4,712,844, Cl. 312-265.000.

Quaker Oats Company, The: *See*—
Moomaw, David E., 4,713,036, Cl. 446-145.000.

Quayle, Bruce R., to Westinghouse Electric Corp. Microprocessor based motor protective relay with maximum number of starts per time interval limiter. 4,713,718, Cl. 361-29.000.

Quick, James R.; Mitchell, James W.; and Cooley, Dennis A., to International Paper Co. Package for microwave cooking with controlled thermal effects. 4,713,510, Cl. 219-10.55E.

Quintech Corporation: *See*—
Kasboske, George C., 4,713,736, Cl. 362-214.000.

Raabe, Rodney D.; Mrowka, Joseph J.; McCuin, Jon P.; and Noonan, Joseph F., to General Electric Company. Lighting circuit breaker panelboard modular assembly. 4,713,728, Cl. 361-363.000.

Raccah, Paul M.: *See*—
Michel, Christian G.; Schachter, Rozalie; Kuck, Mark A.; Baumann, John A.; and Raccah, Paul M., 4,713,192, Cl. 252-62.30R.

Radigan, Richard J.: *See*—
Hung, Paul L. K.; Radigan, Richard J.; and Rosen, David S., 4,713,298, Cl. 428-461.000.

Radisensor AB: *See*—
Hok, Bertil, 4,712,566, Cl. 128-748.000.

Ragle, Herbert U.: *See*—
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Rakover, Eleonora: *See*—
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Rakpongs, Fah: *See*—
Catiller, Robert D.; Faivre, John D.; and Rakpongs, Fah, 4,713,608, Cl. 324-142.000.

Ralston Purina Company: *See*—
Krinski, Thomas L.; and Steinmetz, Alan L., 4,713,116, Cl. 106-154.100.

Ramsden, Steven L., to Grain Processing Corporation. Fermentation methods and apparatus. 4,713,345, Cl. 435-305.000.

Ramsey, Douglas P.; and O'Brien, Michael J. Self-sealing closure. 4,712,704, Cl. 220-254.000.

Ramtron Corporation: *See*—
McMillan, Larry; Paz de Araujo, Carlos; and Rohrer, George A., 4,713,157, Cl. 204-192.110.

Ranco Incorporated: *See*—
Marks, Robert T., 4,712,582, Cl. 137-625.290.

Randall, Warwick, to Stanley-Bostitch, Inc. Shipping package containing coiled fastener packages. 4,712,676, Cl. 206-338.000.

Rangwala, Badruddin K.: *See*—
McDonald, Kenneth P.; Rangwala, Badruddin K.; Owen, Barry C.; and Rodocker, Frank A., 4,712,665, Cl. 198-346.200.

Rantanen, Rauno; and Westergard, Sivert, to Oy Wartsila Ab. Device for two-sided coating of a paper web. 4,712,506, Cl. 118-103.000.

Rao, Purushothama; and Marsh, Frederick L., to GNB Incorporated. Method of preparing lead-acid battery plates and lead-acid batteries containing plates so prepared. 4,713,304, Cl. 429-136.000.

Rapidel, Jean-Loup: *See*—
Augendre, Claude; Rapidel, Jean-Loup; and Hennes, Jacques, 4,712,425, Cl. 73-460.000.

Rapp, Edward J., to Fork, Inc. Electronic numeric generator. 4,713,787, Cl. 364-717.000.

Rapp, Gisela, administratrix: *See*—
Rapp, Wolfgang, deceased; Hafner, Gunther; and Letsche, Ulrich, 4,712,530, Cl. 123-502.000.

Rapp, Wolfgang, deceased (by Rapp, Gisela, administratrix); Hafner, Gunther; and Letsche, Ulrich, to Daimler-Benz Aktiengesellschaft. Hydraulic adjusting arrangement for an injection pump. 4,712,530, Cl. 123-502.000.

Rasmussen, Holger, to Georgia-Pacific Corporation. Rolled material dispenser with feed roller containing a sliding cutter. 4,712,461, Cl. 83-334.000.

Raspet, Richard; and Wagner, Mark D., to United States of America, Army. Windscreen and two microphone configuration for blast noise detection. 4,712,429, Cl. 73-646.000.

Raychem Corporation: *See*—
Baum, Samuel; and Yaeger, John R., 4,713,643, Cl. 337-140.000.
Noel, Raymond; Robinson, William M.; Cherian, Gabe; Clifford, Thomas H.; Carlomagno, William D.; Deasy, William M.; Grassauer, Willie K.; Haygood, David K.; Sherlock, H. Paul; and White, Harry E., 4,712,721, Cl. 228-56.300.

Rayhanabad, Simon B. Vascular shunt. 4,712,551, Cl. 128-334.00R.

Raytheon Company: *See—*
Byington, Roy E.; and Pease, William M., 4,713,794, Cl. 365-45.000.
Razavi, Fereidoon, to Monogram Industries, Inc. Fiber reinforced products and method for producing same. 4,713,645, Cl. 337-246.000.
RCA Corporation: *See—*
Carrell, Ross M., 4,712,784, Cl. 271-108.000.
Lightstone, Alexander W., 4,712,862, Cl. 350-96.210.
Smith, Edgar M., 4,713,598, Cl. 323-245.000.
White, Allan E., 4,712,578, Cl. 137-271.000.
Red Man Pipe and Supply Company: *See—*
Evans, Richard B., 4,712,585, Cl. 138-44.000.
Reddy, Gauknapalli C.: *See—*
Aretz, Werner; Berscheid, Hans G.; Huber, Gerhard; Fehlhaber, Hans-Wolfram; Kraemer, Hans P.; Sedlacek, Hans-Harald; Ganguli, Bimal N.; Sood, Ratan S.; Gandhi, Julia; and Reddy, Gauknapalli C., 4,713,371, Cl. 514-34.000.
Redko, Grigory V.: *See—*
Arutjunian, Norair S.; Kornena, Elena P.; Kazarian, Robert V.; Ponomareva, Natalya A.; Redko, Grigory V.; Sakhno, Lidia T.; and Zhidkova, Irina S., 4,713,155, Cl. 204-155.000.
Redland Roof Tiles Limited: *See—*
Oberoi, Bhushan K., 4,712,361, Cl. 53-540.000.
Reece, Marvin P.; and Rosan, Jose, Jr., to Rexnord Inc. Expandable fastener assembly. 4,712,955, Cl. 411-17.900.
Rees, Inc.: *See—*
Chebowski, Jerome E., 4,713,509, Cl. 200-328.000.
Reeves, Doyle E., to Hydril Company. Metal-to-metal wedge thread coupling connector. 4,712,815, Cl. 285-334.000.
Reeves, Scott P.: *See—*
Kester, Eugene A.; Reeves, Scott P.; and Zemanek, Danny, 4,712,756, Cl. 248-165.000.
Regency Electronics, Inc.: *See—*
Boone, Joseph E.; and Ahlemeyer, W. Bruce, 4,713,661, Cl. 340-994.000.
Regina Co., Inc., The: *See—*
Duncan, L. Scot; Groth, Hugh F.; and Collins, John M., 4,712,740, Cl. 239-340.000.
Region Wallonne: *See—*
Dumont, Pierre; and Poupaert, Jacques, 4,713,390, Cl. 514-389.000.
Regnier, Kent E.; Hoover, Thomas C.; and Walse, Alan S., to Molex Incorporated. Compliant high density edge card connector with contact locating features. 4,713,013, Cl. 439-62.000.
Reil, Wilhelm; and Deutschbein, Ulrich, to Tetra Pak Finance & Trading S.A. Process for the production of a liquid package and apparatus for implementation of the process. 4,713,048, Cl. 493-74.000.
Reilard, Ulrich, to M.A.N.Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft. Electronic valve control for sloughing machines. 4,712,682, Cl. 209-455.000.
Reinecke, Paul: *See—*
Kramer, Wolfgang; Weissmuller, Joachim; Reiser, Wolf; Berg, Dieter; Brandes, Wilhelm; and Reinecke, Paul, 4,713,379, Cl. 514-212.000.
Salzburg, Herbert; Hajek, Manfred; Hagemann, Hermann; Kuhle, Engelbert; Fuhrer, Wolfgang; Hansaler, Gerd; Brandes, Wilhelm; and Reinecke, Paul, 4,713,389, Cl. 514-373.000.
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Reinmuller, Johannes. Plastic implant. 4,713,073, Cl. 623-8.000.
Reiser, Wolf: *See—*
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Reiss, Alan, to World Gaming Consultants. Device for obtaining subsets from a field of characters. 4,712,796, Cl. 273-148.00R.
Rempfler, Hermann: *See—*
Schurter, Rolf; and Rempfler, Hermann, 4,713,109, Cl. 71-94.000.
Remz, Harvey M.; Gordon, Philip J.; Cunningham, John D.; and Melnik, Joseph D., to Chesebrough-Pond's, Inc. Nail polish compositions and means for applying same. 4,712,571, Cl. 132-88.700.
Renaud, Jean-Marie; Gambs, Paul; Perrot, Jean-Claude; and Taillebois, Jacques, to M.C.B. Optical position locating device. 4,713,541, Cl. 250-231.0SE.
Renga, James M.: *See—*
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Renner, Alfred; Haug, Theobald; and Schreiber, Bruno, to Ciba-Geigy Corp. Polymers formed from allyl-substituted or methallyl-substituted, bicyclic, unsaturated dicarboxylic anhydrides. 4,713,417, Cl. 525-117.000.
Renner, Alfred: *See—*
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Reno, Mark E.; Olson, Robert K.; and Kalnes, Tom N., to UOP Inc. Multiple single-stage hydrocracking process. 4,713,167, Cl. 208-59.000.
Renshaw, Robert H.: *See—*
Idvorian, Nick; and Renshaw, Robert H., 4,713,098, Cl. 55-345.000.
Renz, Klaus: *See—*
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Renzi, Fiorenzo; Rivetti, Franco; Romano, Ugo; and Gagliardi, Claudio, to Enichem Sintesi S.p.A. Liquid and polymerizable composition suitable for the production of organic glasses endowed with high abrasion strength. 4,713,433, Cl. 526-314.000.
Research Corporation: *See—*
Wilkins, Tracy D.; and Lyerly, David M., 4,713,240, Cl. 424-92.000.
Research Corporation Technologies, Inc.: *See—*
Srinivasan, Vadake R.; Cary, Jeffrey W.; Chon, Younghae; and Narva, Kenneth E., 4,713,336, Cl. 435-155.000.
Research Development Corporation of Japan: *See—*
Shimizu, Ryuichi; and Ikuta, Takashi, 4,713,687, Cl. 358-138.000.
Umemura, Shizuo, 4,713,258, Cl. 427-35.000.
Research Triangle Institute: *See—*
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Resonex, Inc.: *See—*
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Resuggan, Peter L.: *See—*
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Rexnord Inc.: *See—*
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Reynolds, Robert L. Drilling fixture and work holder. 4,712,950, Cl. 408-72.00R.
Rhoades, Randy L. Optical keyboard. 4,713,535, Cl. 250-221.000.
Rhythm Watch Company Limited: *See—*
Tanabe, Tohru, 4,712,926, Cl. 368-251.000.
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Ricciardelli, Robert H., to Criticare Systems, Inc. Liquid separator for gas analyzer. 4,713,095, Cl. 55-189.000.
Riccitiello, Salvatore R.; Smith, Marnell; Goldstein, Howard E.; and Zimmerman, Norman B., to United States of America, National Aeronautics and Space Administration. Ceramic/ceramic shell tile thermal protection system and method thereof. 4,713,275, Cl. 428-76.000.
Rich, Donald R.: *See—*
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Ezer, Elemer; Harsanyi, Kalman; Petho, Hajnalka V.; Matuz, Judit; Szporny, Laszlo; Cholnoky, Eszter; Kuthi, Csaba; Trischler, Ferenc; Hegedus, Bela; Kapolnas, Marta; and Kallay, Anna, 4,713,388, Cl. 514-346.000.
Ricoh Company, Ltd.: *See—*
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Shimada, Masaru; Kawanishi, Toshiyuki; Murakami, Kakuji; Aruga, Tamotsu; and Uemura, Hiroyuki, 4,713,113, Cl. 106-22.000.
Ridgwell, Robert H., to Boeing Company, The. Temperature control device for jet engine nacelle associated structure. 4,712,750, Cl. 244-117.00A.
Riediker, Martin; Meier, Kurt; and Zweifel, Hans. Titanocenes and a radiation-polymerizable composition containing these titanocenes. 4,713,401, Cl. 522-65.000.
Rieger, Gerald: *See—*
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Riemenschnschneider, Bert R.: *See—*
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Rieter Machine Works Limited: *See—*
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Sommer, Hans-Jorg; Mutter, Heinz; Wirz, Armin; and Graf, Felix, 4,713,655, Cl. 340-677.000.
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Riley, Elizabeth; and Petersen, Wayne E., to Dow Chemical Company, The. Protected membrane roof system for high traffic roof areas. 4,712,349, Cl. 52-408.000.
Rimmer, James R.; and Sweeney, Ronald M., to Premier Brands U.K. Limited. Production of tea and the like bags. 4,712,358, Cl. 53-450.000.
Rinaldi, Anthony W.: *See—*
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Riordan, Eben M., II: *See*—
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Ritten, Robert G., to Step On Inc. Boat transom platform step device. 4,712,503, Cl. 114-343.000.
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Renzi, Fiorenzo; Rivetti, Franco; Romano, Ugo; and Gagliardi, Claudio, 4,713,433, Cl. 526-314.000.
Rizzie, Joseph W.: *See*—
Hunter, Brook L.; Rizzie, Joseph W.; and Ward, Marvin L., 4,712,847, Cl. 439-155.000.
Robbins, Daniel T.; and Stewart, Melvin T. Hose support. 4,712,755, Cl. 248-49.000.
Robbins, Lanny A., to Dow Chemical Company, The. System and method for removing volatile components from an aqueous medium. 4,713,089, Cl. 55-52.000.
Robert Bosch GmbH: *See*—
Arnold, Herbert; Horbelt, Michael; and Jundt, Werner, 4,713,812, Cl. 371-10.000.
Conrad, Hans-Jurgen, 4,712,998, Cl. 432-159.000.
Gansert, Willi; Lochbrunner, Eduard; and Slansky, Harry, 4,713,573, Cl. 310-329.000.
Heizmann, Frieder, 4,713,707, Cl. 360-106.000.
Roberts, Bruce E.; Black, Jimmy C.; and Matlock, Dyer A., to Harris Corporation. Method of ensuring adhesion of chemically vapor deposited oxide to gold integrated circuit interconnect lines. 4,713,260, Cl. 437-238.000.
Roberts, David A.: *See*—
Maroulis, Peter J.; Coe, Charles G.; Kuznicki, Steven M.; Clark, Patrick J.; and Roberts, David A., 4,713,362, Cl. 502-85.000.
Roberts, Jon A.: *See*—
Erie, David G.; Roberts, Jon A.; and Lee, Eddie C., 4,713,682, Cl. 357-54.000.
Robeson, Lloyd M.: *See*—
Harris, James E.; and Robeson, Lloyd M., 4,713,426, Cl. 525-471.000.
Robinson, Donald L.; and Ojala, William. Fresnell lens and filter for use with computers and the like. 4,712,870, Cl. 350-243.000.
Robinson, William M.: *See*—
Noel, Raymond; Robinson, William M.; Cherian, Gabe; Clifford, Thomas H.; Carlomagno, William D.; Deasy, William M.; Grassauer, Willie K.; Haygood, David K.; Sherlock, H. Paul; and White, Harry E., 4,712,721, Cl. 228-56.300.
Rockwell International Corporation: *See*—
Ek, Matthew C., 4,713,146, Cl. 159-4.200.
Hallford, Ben R.; and Varian, Karl R., 4,713,620, Cl. 328-150.000.
Hallford, Ben R.; and McKenzie, Robert W., 4,713,730, Cl. 361-419.000.
McDonald, Mark A., 4,713,830, Cl. 375-109.000.
Rodi, Anton; and Blaser, Peter, to Heidelberger Druckmaschinen AG. Method and device for determining the operating condition or status of an actuating or adjusting drive of a printing machine. 4,713,593, Cl. 318-572.000.
Rodocker, Frank A.: *See*—
McDonald, Kenneth P.; Rangwala, Badruddin K.; Owen, Barry C.; and Rodocker, Frank A., 4,712,665, Cl. 198-346.200.
Rogall, Wolfgang. Gymnastic and playing device. 4,712,792, Cl. 272-93.000.
Rogers, Robert T.; and Siewert, James C., to Litton Systems, Inc. Fast acting solid state AC circuit breaker. 4,713,720, Cl. 361-97.000.
Rogge, Danny G.: *See*—
Passerell, David P.; and Rogge, Danny G., 4,712,813, Cl. 285-250.000.
Rohm GmbH Chemische Fabrik: *See*—
Langerbeins, Klaus; Schroder, Gunther; and Boehm, Hans-Peter, 4,713,483, Cl. 560-204.000.
Sutterlin, Norbert; Blitz, Hans-Dieter; Mager, Theodor; Jagsch, Karl-Heinz; and Tessmer, Dieter, 4,713,434, Cl. 526-62.000.
Rohm and Haas Co.: *See*—
Carson, William G., 4,713,268, Cl. 428-35.000.
Rohr Industries, Inc.: *See*—
Stoneman, Everett L., 4,712,831, Cl. 279-123.000.
Rohr, Marcel, to K-Tron International, Inc. Vibratory material feeder with vibrating gate. 4,712,669, Cl. 198-771.000.
Rohrer, George A.: *See*—
McMillan, Larry; Paz de Araujo, Carlos; and Rohrer, George A., 4,713,157, Cl. 204-192.110.
Rold, Michael D.: *See*—
Bickelhaupt, Roger; and Rold, Michael D., 4,713,059, Cl. 604-171.000.
Romano, Ugo: *See*—
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Romanski, John G.: *See*—
Bremer, James C.; Hurt, Fred S.; Romanski, John G.; Kroupa, Richard F.; and Kraus, Ronald G., 4,713,533, Cl. 250-203.00R.
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della Valle, Francesco; and Romeo, Aurelio, 4,713,374, Cl. 514-54.000.
Romeu, Ramon. Machine tool. 4,712,282, Cl. 29-27.00C.
Romine, Richard A. Portable and collapsible platform. 4,712,647, Cl. 182-96.000.
Rommes, Hans; and Stoy, Erich, to SMS Schloemann-Siemag AG. Six-high roll stand with offset inner backup rolls. 4,712,416, Cl. 72-241.000.
Romualdus Ter Horst, Gerhardus E.: *See*—
Giezeman, Paulus G.; and Romualdus Ter Horst, Gerhardus E., 4,713,674, Cl. 355-14.0SH.
Roos, Gerhard; Dexling, Hartmut; and Michael, Wolfgang, to L. Schuler GmbH. Drawing apparatus in presses. 4,712,412, Cl. 72-345.000.
Rosan, Jose, Jr.: *See*—
Reece, Marvin P.; and Rosan, Jose, Jr., 4,712,955, Cl. 411-17.000.
Rose, Donald T.: *See*—
Gaskill, Garold B.; Park, Daniel J.; Rullman, Robert G.; Rose, Donald T.; Stiley, Joseph F., III; Barnum, Lewis W.; and Hoff, Don G., 4,713,808, Cl. 370-94.000.
Rose, Leo J. Sea wave dissipator apparatus and method for its manufacture. 4,712,944, Cl. 405-26.000.
Roseano, Giancarlo, to Danieli & C. Officine Meccaniche SpA. Device to count bars. 4,712,666, Cl. 198-503.000.
Rosen, David S.: *See*—
Hung, Paul L. K.; Radigan, Richard J.; and Rosen, David S., 4,713,298, Cl. 428-461.000.
Rosenbaum, Stanley D.; and Plett, Calvin, to Northern Telecom Limited. Amplifier with double rail output. 4,713,838, Cl. 379-252.000.
Rosenberg, Farel. Convertible, self-ligating, archwire positioning orthodontic bracket. 4,712,999, Cl. 433-8.000.
Rosenberg, Farel. Molar controlling and positioning orthodontic appliance adjustable in three planes. 4,713,000, Cl. 433-18.000.
Rosenfeld, Jeffrey I.: *See*—
Hall, Richard A.; and Rosenfeld, Jeffrey I., 4,713,421, Cl. 525-242.000.
Rosenhouse, Harvey: *See*—
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Roskind, James A., to Harris Corporation. Digital hardware selection filter. 4,713,786, Cl. 364-715.000.
Ross, Jeffrey L.: *See*—
Crawford, Donald C.; Ross, Jeffrey L.; Strike, Gary P.; and Mory, Steven W., 4,712,357, Cl. 53-450.000.
Ross, Laurence W.: *See*—
Krietemeier, Rickie F.; and Ross, Laurence W., 4,713,164, Cl. 204-400.000.
Ross, Ron S., Sr.; and Goff, Claude W., Sr. Aerated live well. 4,712,327, Cl. 43-57.000.
Rossner, Heinrich-Otto: *See*—
Bebber, Hans J.; Neuschutz, Dieter; and Rossner, Heinrich-Otto, 4,713,826, Cl. 373-22.000.
Rostek, Paul M.: *See*—
Lauffer, Donald K.; Milby, Gregory H.; Rostek, Paul M.; and Sanwo, Ikuo J., 4,713,827, Cl. 375-7.000.
Roth, C. Deane: *See*—
Downs, John D.; Drury, Raymond L., Jr.; Moser, Kenneth B.; and Roth, C. Deane, 4,713,436, Cl. 528-295.300.
Rothenberg, I. Herbert; and Rothenberg, Thelma. Urinary collection system for male incontinent. 4,713,067, Cl. 604-353.000.
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Rothenberg, I. Herbert; and Rothenberg, Thelma, 4,713,067, Cl. 604-353.000.
Rotomors S.p.A.: *See*—
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Pejouhy, Radi; Nield, Joseph G., Jr.; D'Entremont, John R.; Beggs, Louis C.; and Rotulo, Fabrizio, 4,713,717, Cl. 361-26.000.
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Johnson, Fred L., 4,712,518, Cl. 123-48.00B.
Rousselot, Andre , to Somfy. Linear actuator. 4,712,440, Cl. 74-89.150.
Rovo, Peter: *See*—
David, Dezso; Rovo, Peter; Sipos nee Richter, Terez; Molnar, Gyorgy; Deme, Istvan; and Karnitscher, Tamas, 4,713,078, Cl. 8-94.150.
Rowe, John B.: *See*—
Bryan, Dennis P.; and Rowe, John B., 4,713,815, Cl. 371-29.000.
Rox, Rainer: *See*—
Spilker, Harry; Rox, Rainer; and Peschl, Heinz-Walter, 4,713,199, Cl. 252-633.000.
Roy, George N.; and Roy, James. Hay bale cover. 4,712,672, Cl. 206-83.500.
Roy, James: *See*—
Roy, George N.; and Roy, James, 4,712,672, Cl. 206-83.500.
Roy, Suva B., to Du Pont de Nemours, E. I., and Company. Co-spray technique. 4,712,310, Cl. 34-5.000.
RTC Industries, Inc.: *See*—
Breslow, David, 4,712,694, Cl. 211-184.000.
RTE Corporation: *See*—
Sutton, Quinten H., 4,713,018, Cl. 439-185.000.
Rubin, Gene L., to Liberty Gifts, Inc. Multiple modular frame apparatus for displaying items. 4,712,322, Cl. 40-156.000.
Rubin, Howard: *See*—
Schiraldi, Michael T.; Perl, Martin M.; and Rubin, Howard, 4,713,243, Cl. 424-151.000.
Rullman, Robert G.: *See*—
Gaskill, Garold B.; Park, Daniel J.; Rullman, Robert G.; Rose, Donald T.; Stiley, Joseph F., III; Barnum, Lewis W.; and Hoff, Don G., 4,713,808, Cl. 370-94.000.
Rullo, Antonio: *See*—
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Russell, David B., to Dennison Manufacturing Company. Method and apparatus for dispensing fasteners. 4,712,677, Cl. 206-345.000.

Russell, Donald J.; and Sanders, Michael A., to Healthdyne, Inc. Patient monitor for providing respiration and electrocardiogram signals. 4,713,558, Cl. 307-264.000.

Russell, Frederick E., to Protectaire Systems Co. Method and apparatus for handling sludge. 4,713,181, Cl. 210-776.000.

Russell, Michael J., to Geotech Engineering. Seismic air gun. 4,713,800, Cl. 367-144.000.

Rutledge, Raleigh N.: *See*—
Searl, Alonzo H.; Hahn, Granville J.; and Rutledge, Raleigh N., 4,713,271, Cl. 428-36.000.

Rutt, Kenneth S.: *See*—
Strong, Russell W.; and Rutt, Kenneth S., 4,712,568, Cl. 130-272.000.

Ryder, Francis E.; and Lisak, Stephen P., to Ryder International Corporation; and Textron, Inc., a part interest. Clam shell gear box housing and retainer. 4,713,739, Cl. 362-424.000.

Ryder International Corporation: *See*—
Ryder, Francis E.; and Lisak, Stephen P., 4,713,739, Cl. 362-424.000.

Saab-Scania AB: *See*—
Johansson, Hans; and Goras, Anders, 4,712,420, Cl. 73-118.100.

Saam, Werner, to Joseph Vogele AG. Progressive distributor for lubricants. 4,712,649, Cl. 184-7.400.

Saarinen, Esko, to Oy Tampella AB. Extended nip press with displaceable center of gravity for the supporting force. 4,713,147, Cl. 162-358.000.

Sabet, Iraj, to Stella Werke AG. Apparatus for producing coated panels. 4,712,765, Cl. 249-91.000.

Sachse, Hans-Ernst, to Sachse, Hans-Ernst. Guiding mandrin for drainage ducts. 4,713,058, Cl. 604-165.000.

Sachsenwerk AG: *See*—
Herrmann, Johann, 4,713,501, Cl. 200-50.0AA.

Sahara, Masayoshi: *See*—
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 4,712,904, Cl. 354-475.000.

Saibe, Seiichi: *See*—
Aso, Hideo; Fujino, Hirohisa; and Saibe, Seiichi, 4,712,493, Cl. 112-112.000.

Saibic, Darryl S., to Florida Development and Manufacturing, Inc. Swimming pool water purifier. 4,713,170, Cl. 210-85.000.

Sainen, Tsutomu, to Tsudakoma Corp. Pick spacing controlling device and method. 4,712,588, Cl. 139-309.000.

St. Clair, Terry L.; Maudgal, Shubha; and Pratt, J. Richard, to United States of America, National Aeronautics and Space Administration. Poly(carbonate-imide) polymer. 4,713,439, Cl. 528-353.000.

Saito, Koji; and Okawa, Hiroshi, to Murata Manufacturing Co., Ltd. Cover attaching arrangement for casing of dielectric coaxial resonators. 4,713,633, Cl. 333-222.000.

Saito, Shigeru: *See*—
Oikawa, Shoji; Yamagishi, Hiroshi; Saito, Shigeru; Fujita, Tsuyoshi; and Watanabe, Takayoshi, 4,713,494, Cl. 174-68.500.

Saito, Takaharu: *See*—
Sato, Akira; Sato, Kazuo; Saito, Takaharu; Shima, Junkoh; Mizutani, Kansei; and Mikawa, Toshimasa, 4,713,767, Cl. 364-453.000.

Saito, Tatsuya, to Kai Cutlery Center Co., Ltd. Safety razor. 4,712,301, Cl. 30-47.000.

Saito, Yutaka: *See*—
Yoshiki, Naokazu; Saito, Yutaka; and Haba, Tsuneo, 4,712,407, Cl. 72-68.000.

Sakaguchi, Yasuo: *See*—
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Sakai, Hideaki; and Kanai, Tadashi, to Shiratori Pharmaceutical Co., Ltd.; and Suntory Limited. Preparation process of (6R)-tetrahydro-L-biopterin. 4,713,454, Cl. 544-258.000.

Sakakibara, Yasuo: *See*—
Nomura, Etuzo; Sakakibara, Yasuo; Kozawa, Tetsuo; Nishida, Yukio; and Kondo, Ikuzo, 4,712,497, Cl. 112-315.000.

Sakamoto, Teruo; Kawai, Sadao; Noda, Kinzaburo; Takeda, Toyohiko; and Kato, Hiroshi, to Shionogi & Co., Ltd. Long-acting formulation of cefaclor. 4,713,247, Cl. 424-461.000.

Sakata, Kunihiro: *See*—
Nakamura, Kozoo; Kozima, Yasuyuki; Hamada, Nagaharu; and Sakata, Kunihiro, 4,713,699, Cl. 358-296.000.

Sakato, Keiichiro, to Nippon Kogaku K.K. Exposure method and apparatus for semiconductor fabrication equipment. 4,712,910, Cl. 355-53.000.

Sakhno, Lidia T.: *See*—
Arutjunian, Norair S.; Kornena, Elena P.; Kazarian, Robert V.; Ponomareva, Natalya A.; Redko, Grigory V.; Sakhno, Lidia T.; and Zhidkova, Irina S., 4,713,155, Cl. 204-155.000.

Sakuma, Nobuo; and Takanashi, Keinichi, to Ricoh Company, Ltd. Lens system for deflected light beam. 4,712,884, Cl. 350-434.000.

Sakurada, Nobuaki: *See*—
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Watanabe, Yoshitaka; Sakurada, Nobuaki; Kawamura, Hideaki; and Sato, Yuichi, 4,713,746, Cl. 346-1.100.

Salacuse, Frank S. Universal hanging packaging system. 4,712,671, Cl. 206-44.00R.

Salandanan, Carmelita: *See*—
Patel, Arvind D.; and Salandanan, Carmelita, 4,713,183, Cl. 252-8.515.

Salomon S. A.: *See*—
Morell, Joseph; and Petrini, Roland, 4,712,315, Cl. 36-117.000.

Salts, Thomas R., to Besser Company. Bag palletizing system. 4,712,975, Cl. 414-786.000.

Saluski, Robert A., to GTE Communication Systems Corporation. Real time usage meter for a processor system. 4,713,791, Cl. 364-900.000.

Salvucci, Antonio: *See*—
Princiotta, Raymond A., Sr.; and Salvucci, Antonio, 4,712,787, Cl. 271-311.000.

Salzburg, Herbert; Hajek, Manfred; Hagemann, Hermann; Kuhle, Engelbert; Fuhrer, Wolfgang; Hanssler, Gerd; Brandes, Wilhelm; and Reinecke, Paul, to Bayer Aktiengesellschaft. Fungicidally and bactericidally active acylated saccharin derivatives. 4,713,389, Cl. 514-373.000.

Sanden Corporation: *See*—
Aoki, Kazumi; and Fujiu, Minoru, 4,712,385, Cl. 62-333.000.

Sanders, Michael A.: *See*—
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Sandoz Pharmaceuticals Corp.: *See*—
Heller, Jorge; and Penhale, Donald W. H., 4,713,441, Cl. 528-392.000.

Sanelli, Danilo. Knife having a handle coated with an elastomer, particularly for professional uses. 4,712,304, Cl. 30-343.000.

Sangamo Weston, Inc.: *See*—
Simonetti, John J., 4,713,198, Cl. 252-301.170.

Sanjoh, Akira: *See*—
Yoshizawa, Shuji; Mitani, Wataru; Yamamoto, Mariko; Sanjoh, Akira; and Ikezue, Tatsuya, 4,713,308, Cl. 430-65.000.

Sano, Yoshiaki: *See*—
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SANOFI and Industria Chimica Prodotti FRANCIS S.p.A.: *See*—
Andre, Jean-Daniel; Grossi, Pierre-Jean; Heymes, Alain; and Manzaroli, Giovanni V., 4,713,485, Cl. 562-470.000.

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Bayol, Alain; Blanc, Francis; Lansen, Jacqueline; Maffrand, Jean-Pierre; and Pereillo, Jean-Marie, 4,713,373, Cl. 514-54.000.

Santa Barbara Research Center: *See*—
Malek, Fritz J., 4,712,867, Cl. 350-103.000.

Santrade Limited: *See*—
Isaksson, Karl B.; and Svahn, Bror G. K., 4,712,952, Cl. 408-211.000.

Sanwo, Ikuo J.: *See*—
Lauffer, Donald K.; Milby, Gregory H.; Rostek, Paul M.; and Sanwo, Ikuo J., 4,713,827, Cl. 375-7.000.

Sanyo Electric Co., Ltd.: *See*—
Yasuda, Isao; Yoshisato, Yorinobu; Yoshikawa, Hideki; and Taketa, Kazuhiko, 4,713,709, Cl. 360-121.000.

Sasaki, Hiromu: *See*—
Anzai, Shunju; Sasaki, Hiromu; Kunikawa, Norihide; and Ohgita, Kazuyuki, 4,713,550, Cl. 250-560.000.

Sasaki, Hironaka: *See*—
Okamoto, Masayoshi; Suzuki, Katsuhisa; Hoshino, Ryoichi; and Sasaki, Hironaka, 4,712,612, Cl. 165-146.000.

Sasaki, Makoto; Yoshida, Jun; Shimizu, Yoshishige; Akazawa, Kiyoshi; Kishita, Eiji; and Hirata, Kaoru, to Mitsubishi Rayon Company Ltd. Fragrant fiber. 4,713,291, Cl. 428-373.000.

Sasaki, Makoto: *See*—
Takatsu, Haruyoshi; Sasaki, Makoto; Tanaka, Yasuyuki; and Sato, Hisato, 4,713,468, Cl. 558-411.000.

Sasaki, Nobuyoshi; Baba, Susumu; and Arai, Hisahiro, to M.C.L. Co., Ltd. Process for producing hollow cast article. 4,712,605, Cl. 164-516.000.

Sasaki, Shingo: *See*—
Matsuhisa, Tadaaki; and Sasaki, Shingo, 4,713,206, Cl. 264-328.200.

Sasaoka, Michio: *See*—
Torii, Sigeru; Tanaka, Hideo; Sasaoka, Michio; Uto, Seiryu; and Hayase, Syozo, 4,713,452, Cl. 540-358.000.

Sasazawa, Kazuo, to Taiyo Yuden Kabushiki Kaisha. Dielectric ceramic composition. 4,713,726, Cl. 361-321.000.

Sato, Akira; Sato, Kazuo; Saito, Takaharu; Shima, Junkoh; Mizutani, Kansei; and Mikawa, Toshimasa, to Toyota Jidosha Kabushiki Kaisha. Apparatus for calculating position of vehicle. 4,713,767, Cl. 364-453.000.

Sato, Hisato: *See*—
Takatsu, Haruyoshi; Sasaki, Makoto; Tanaka, Yasuyuki; and Sato, Hisato, 4,713,468, Cl. 558-411.000.

Sato, Kazuo: *See*—
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Sato, Kuniaki: *See*—
Ohta, Norio; Yanagishima, Fumiya; Kaihara, Toshikazu; Kishida, Akira; Sato, Kuniaki; and Ochiai, Masanobu, 4,713,154, Cl. 204-145.00R.

Sato, Kunio: *See*—
Sato, Masao; Ichimura, Masaaki; and Sato, Kunio, 4,713,115, Cl. 106-118.000.

Sato, Masao; Ichimura, Masaaki; and Sato, Kunio, to Sumitomo Cement Co., Ltd. Method for demolishing durable structures. 4,713,115, Cl. 106-118.000.

Sato, Tadashi: *See*—
Ohno, Yasunori; Kurosawa, Tomoe; Sato, Tadashi; Kurosawa, Yukio; and Hakamata, Yoshimi, 4,713,585, Cl. 315-111.810.
Takahashi, Teruomi; and Sato Tadashi, 4,713,698, Cl. 358-296.000.
Sato, Tetsuo: *See*—
Hasegawa, Kenji; Sato, Tetsuo; and Iwanami, Teruo, 4,713,266, Cl. 427-412.500.
Sato, Yuichi: *See*—
Kawamura, Hideaki; Sakurada, Nobuaki; Sato, Yuichi; and Watanabe, Yoshitaka, 4,713,701, Cl. 358-298.000.
Watanabe, Yoshitaka; Sakurada, Nobuaki; Kawamura, Hideaki; and Sato, Yuichi, 4,713,746, Cl. 346-1.100.
Satoh, Fumio: *See*—
Tatsuoka, Toshio; Suzuki, Kenji; Imao, Kayoko; Satoh, Fumio; Miyano, Seiji; and Sumoto, Kunihiro, 4,713,453, Cl. 544-60.000.
Satou, Yasushi: *See*—
Nagai, Toshinari; Masui, Takatoshi; Satou, Yasushi; and Katsuno, Toshiyasu, 4,712,373, Cl. 60-274.000.
Sauvee, Jean-Paul, to Bendix France. Brake actuator with automatic adjustment. 4,712,655, Cl. 188-196.00D.
Saviotti, Giancarlo: *See*—
Antolini, Adriano; Morigi, Rodolfo; and Saviotti, Giancarlo, 4,712,832, Cl. 297-180.000.
Savvateev, Konstantin L.: *See*—
Babaian, Eduard A.; Gerasimova, Galina A.; Davydov, Anatoly B.; Utyamyshev, Rustam I.; Khromov, Gennady L.; Metelitsa, Vladimir I.; Vikbert, Anatoly M.; Savvateev, Konstantin L.; Piotrovsky, Vladimir K.; and Novikova, Elizaveta B., 4,713,239, Cl. 424-81.000.
Sawyer, Thomas F., to United States of America, Air Force. Apparatus for casting directionally solidified articles. 4,712,604, Cl. 164-513.000.
Scangraphic Dr. Boger GmbH: *See*—
Holthusen, Bernd, 4,712,896, Cl. 354-5.000.
Schachter, Rozalie: *See*—
Michel, Christian G.; Schachter, Rozalie; Kuck, Mark A.; Baumann, John A.; and Raccah, Paul M., 4,713,192, Cl. 252-62.30R.
Schaefer, Daniel J.; and Belt, Kenneth W., to General Electric Company. Apparatus and method of acquiring physiological gating signals for magnetic resonance imaging of moving objects. 4,712,560, Cl. 128-653.000.
Schaefer, Klaus-Dieter, to Ernst Leitz Wetzlar GmbH. Method and circuit arrangement for the automatic determination of an exposure value. 4,712,903, Cl. 354-433.000.
Schafer, Berthold, to Deutsche Forchungs- und Versuchsanstalt fur Luft- und Raumfahrt e.V. Missile. 4,712,748, Cl. 244-3.220.
Schaffitz, Wolfgang, to Institut fur Motorenbau Professor Huber e.V. Fuel injection system. 4,712,528, Cl. 123-446.000.
Schamblin, Charles. Vehicle warning system. 4,713,732, Cl. 362-61.000.
Schan, Edward P., Jr.: *See*—
Brahm, David J.; Grinn, James M.; Hepler, Edward L.; and Schan, Edward P., Jr., 4,713,834, Cl. 379-28.000.
Scharf, James E. Grain box cleanout device. 4,712,821, Cl. 294-19.100.
Schauder, Colin D., to Westinghouse Electric Corp. Vector-controlled unrestricted frequency changer (UFC) system and variable speed AC motor drive using such a system. 4,713,745, Cl. 363-161.000.
Schaumberg, John P.; Hokanson, Gerard C.; French, James C.; Tunac, Josefino B.; and Underhill, Marjorie A., to Warner-Lambert Company. 2-chloropentostatin compound having adenosine diaminase inhibitory activity. 4,713,372, Cl. 514-45.000.
Scheibli, Peter; and Seitz, Karl, to Ciba-Geigy Corporation. Process for dyeing or printing textile fibre materials with reactive dye containing vinyl sulfonyl-type group and chloro-triazinyl amino group. 4,713,082, Cl. 8-549.000.
Scheller, Holger, to Guilford Mills, Inc. Napped warp-knitted fabric and method of producing same. 4,712,281, Cl. 28-162.000.
Scher, Herbert I.: *See*—
Ungar, Israel S.; O'Neill, Nelson L.; Scher, Herbert I.; and O'Dell, Robin D., 4,713,138, Cl. 156-307.400.
Scherer, Wilfried: *See*—
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Schiesser, Walter A. Extrusion means for producing rubber profiles. 4,712,989, Cl. 425-114.000.
Schiller, Harold, to Ardrox Inc. Composition and method for stripping films from printed circuit boards. 4,713,144, Cl. 156-656.000.
Schimko, Reinhold, to Universal Maschinenfabrik Dr. Rudolf Schieber GmbH & Co. KG. Flat knitting machine. 4,712,391, Cl. 66-115.000.
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Schimmel, Paul R.: *See*—
Jasin, Maria; and Schimmel, Paul R., 4,713,337, Cl. 435-172.300.
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Schiraldi, Michael T.; Perl, Martin M.; and Rubin, Howard, to Johnson & Johnson Products, Inc. Bioadhesive extruded film for intra-oral drug delivery and process. 4,713,243, Cl. 424-151.000.
Schittenhelm, Hans-Joachim; Joseph, Werner; and Trogel, Gerhard, to Bayer Aktiengesellschaft. Heating element combined glass/enamel overcoat. 4,713,530, Cl. 219-543.000.
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Schlumberger Technology Corp.: *See*—
Herron, Michael M., 4,712,424, Cl. 73-152.000.
Schmetz GmbH & Co. KG Unternehmensverwaltung: *See*—
Schmetz, Peter; and Gierse, Dieter, 4,713,124, Cl. 148-128.000.
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Schmidt, Rolf; and Schneider, Roland, to Schmidt Feintechnik GmbH. Plotter stylus with cap covered vent. 4,712,937, Cl. 401-213.000.
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Schmitz, Jurgen, to Mannesmann Rexroth GmbH. Method and apparatus for compensating the variable weight of a mass acting on a hydraulic drive, in particular for the upright drive cylinder of a lapping machine. 4,712,470, Cl. 91-433.000.
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Schneider, Burnett M., to Aqua-Chem Inc. Scale inhibitor. 4,713,195, Cl. 252-180.000.
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Schmidt, Rolf; and Schneider, Roland, 4,712,937, Cl. 401-213.000.
Schneider, Wesley. Liquid storage and delivery system for protective mask. 4,712,594, Cl. 141-114.000.
Schoendorfer, Donald W.; and Hansen, Lee E., to Hemascience Laboratories, Inc. Plasmapheresis system and method. 4,713,176, Cl. 210-645.000.
Schoene, Carl M., to GTE Products Corporation. Sealing structure for metal vapor arc discharge lamps. 4,713,580, Cl. 313-624.000.
Schoening, Josef; and Elter, Claus, to Hochtemperatur-Reaktorbau GmbH. Nuclear reactor plant housed in a steel pressure vessel with a gas cooled small high temperature reactor. 4,713,213, Cl. 376-299.000.
Scholten, Gerard J.; Dieleman, Louis F. A.; and Blankers, Johannes M. M., to U.S. Philips Corporation. Tape packing for electrical or electronic components. 4,712,675, Cl. 206-332.000.
Scholz, Matthew T.: *See*—
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Schreib, Bernhard; and Schreib, John K. Bird feeder made from a plastic bottle, including apparatus therefor and a method of making. 4,712,512, Cl. 119-52.00R.
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Schreib, Bernhard; and Schreib, John K., 4,712,512, Cl. 119-52.00R.
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Schreiber Foods, Inc.: *See*—
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Schrimpf, Christian, to Leine & Konig. System for sealing barrier constructions in subterranean galleries. 4,712,945, Cl. 405-132.000.
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Bukoschek, Romuald L.; Eckel, Merowech; and Schroder, Johann, 4,712,386, Cl. 62-342.000.
Schroder, Ulf. Crystallized carbohydrate matrix for biologically active substances, a process of preparing said matrix, and the use thereof. 4,713,249, Cl. 424-488.000.
Schroeder, Clifford A. Molded fiberglass air return filter grille. 4,713,099, Cl. 55-385.00R.

Schudel, Peter; Schwarzenbach, Rolf; and Gonzenbach, Hans U., to Givaudan Corporation. Process for treating 2-ethylhexyl p-methoxycinnamate in the presence of a phenol. 4,713,473, Cl. 560-053.000.
Schulte, Thomas L. Method of ameliorating obstructions of the bowel. 4,713,377, Cl. 514-166.000.
Schulten, Rudolf: *See—*
Weirich, Walter; Barnert, Heiko; Oertel, Michael; and Schulten, Rudolf, 4,713,234, Cl. 423-648.00R.
Schultz, Thomas G.; Gross, Andrew; Pappas, Barbara; Shifrin, George D.; and Mack, Lois, to Express Communications, Inc. Electronic mail. 4,713,780, Cl. 364-514.000.
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Schupp, Eberhard; Osterloh, Rolf; Loch, Werner; and Ahlers, Klaas, to BASF Aktiengesellschaft. Binders for cathodic electrocoating. 4,713,406, Cl. 523-415.000.
Schupp, Eberhard: *See—*
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Schurter, Rolf; and Rempfler, Hermann, to Ciba Geigy Corporation. 2-(4-(5-chloro-3-fluoropyridin-2-yloxy)phenoxy)-propionic acid-propynyl ester with herbicidal activity. 4,713,109, Cl. 71-94.000.
Schuster, Richard L., to Manville Corporation. Carton with improved handle. 4,712,728, Cl. 229-52.00B.
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Cahill, Richard F.; Eck, Jeffrey A.; Schwantz, Gerald L.; Theriault, John P.; Turek, Philip A.; Udd, Eric; Wagoner, Raymond E.; and Wanser, Keith H., 4,712,306, Cl. 33-304.000.
Schwartz, Henry L., to Sequoia-Turner Corporation. Tube trap apparatus. 4,713,218, Cl. 422-99.000.
Schwartz, Myron, to 501 Aeroflex Laboratories, Incorporated. Low cogging motor. 4,713,569, Cl. 310-152.000.
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Schwinn Bicycle Company: *See—*
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Science & Creative Co., Ltd.: *See—*
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Scott, A. Carlisle; Clayton, Jan E.; and Garnier, Jacques, to Teknowledge, Incorporated; and Compagnie Generale de Geophysique. Intelligent assistant for using and operating computer system capabilities to solve problems. 4,713,775, Cl. 364-513.000.
Scott, Francis H.: *See—*
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Scott, John C., to United States of America, Air Force. Igniter electrode life control. 4,713,574, Cl. 313-130.000.
Scott, Millard: *See—*
Solstad, Russell V.; Scott, Millard; and Holliday, William, 4,713,611, Cl. 324-158.00F.
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Searl, Alonzo H.; Hahn, Granville J.; and Rutledge, Raleigh N., to Cosden Technology, Inc. Foamed polymer tubing. 4,713,271, Cl. 428-36.000.
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Sedlacek, Hans-Harald: *See—*
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Segal, Brahm R. Semi-conductor transformerless audio amplifier. 4,713,629, Cl. 330-263.000.
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Seidel, Peter; Pelzl, Leo; and Zell, Karl, to Siemens Aktiengesellschaft. Device connecting the shielding of plugs to a subrack ground. 4,712,849, Cl. 439-607.000.
Seidler, Jack, to North American Specialties Corp. Terminal strip with attached support and method of manufacture. 4,712,850, Cl. 439-861.000.
Seighman, Jon T., to Durkee Industrial Foods Corp. Process for encapsulating liquid acids and product. 4,713,251, Cl. 426-96.000.
Seiko Epson Corporation: *See—*
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Tanaka, Fumihiro; Shimada, Yoshio; Yamaguchi, Kaneo; Matsushima, Kenichi; and Watanabe, Shinya, 4,713,691, Cl. 358-148.000.
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Sekida, Minoru: *See—*
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Sekimura, Nobuyuki; Kamio, Masaru; Takao, Hideaki; Motoi, Taiko; and Murata, Tatsuo, to Canon Kabushiki Kaisha. Ferroelectric liquid crystal device having color filters on row or column electrodes. 4,712,874, Cl. 350-339.00F.
Sekine, Fumimaro; Kurosaki, Tomihiro; Ukena, Toshinao; and Kamitani, Hiroshi, to Kao Corporation. Ether carboxylates and process for preparing same. 4,713,487, Cl. 562-587.000.
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Selak, Martin. Suction sheet separator with adjustable feed restraint and stack confinement. 4,712,783, Cl. 271-100.000.
Selfix, Inc.: *See—*
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Semiconductor Energy Laboratory Co., Ltd.: *See—*
Yamazaki, Shunpei; Itoh, Kenji; and Nagayama, Susumu, 4,713,518, Cl. 219-121.0LM.
Senske, Wilhelm; Herkert, Roland; Marschall, Norbert; and Greeb, Karl-Heinrich, to Licentia Patent-Verwaltungs-GmbH. Homogeneous photoconductive layer of amorphous silicon and hydrogen. 4,713,311, Cl. 430-127.000.
Sensor Diagnostics, Inc.: *See—*
Mitchell, David H.; and Mitchell, Ralph M., 4,713,347, Cl. 436-501.000.
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Servel, Michel; and Thomas, Alain. Method and device for converting digital channel multiframes into packet multiframes. 4,713,804, Cl. 370-68.000.
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Seshamani, Venkatraman; and Money, Dudley P., to Foster Wheeler Energy Corporation. Expansion seal assembly. 4,712,938, Cl. 403-24.000.
Sexton, Diane, to Dow Chemical Company, The. Resin composition and a process for preparing laminates therefrom. 4,713,137, Cl. 156-233.000.
Shah, Mahendra, to Schering Corporation. Sustained release dosage form. 4,713,237, Cl. 424-78.000.
Shannon, Patrick: *See—*
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Sharp, Edward J.: *See—*
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Anzai, Shunju; Sasaki, Hiromu; Kunikawa, Norihide; and Ohgita, Kazuyuki, 4,713,550, Cl. 250-560.000.
Katoh, Hiroyuki, 4,713,511, Cl. 219-10.55D.
Kimura, Shinichi, 4,713,522, Cl. 219-202.000.
Sharpe, Murem S.; Bryson, Eugene; Manduley, Flavio; Riordan, Eben M., II; and Flesser, Brian D., to Pitney Bowes, Inc. System for centralized processing of accounting and payment functions. 4,713,761, Cl. 364-406.000.
Shaw, Ray H., to Mining Tools, Inc. Div. of Smith California. Retainer device for drill bit. 4,712,626, Cl. 175-410.000.
Shea, Allan K.: *See—*
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Shepard & Associates: *See—*
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Shepherd, Wayne P.: *See—*
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Sherwood, Edward F.; and Orndorff, Karl B., to Westinghouse Electric Corp. Elevator cab. 4,712,651, Cl. 187-1.00R.
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Bruno, Robert; Kipperman, Stuart R.; Mayer, Geoffrey R.; and Thomas, Michael, 4,713,064, Cl. 604-257.000.

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Shiffler, Donald A., to Du Pont de Nemours, E. I., and Company. Water-dispersible synthetic fiber. 4,713,289, Cl. 428-361.000.
Shifrin, George D.: *See*—
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Shimada, Yoshio: *See*—
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Shimazaki, Toru; and Matsuura, Hiroyuki, to Yokogawa Electric Corporation; and Yokogawa Medical Systems, Limited. Nuclear magnetic resonance imaging apparatus. 4,713,616, Cl. 324-309.000.
Shimizu, Masao: *See*—
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Shimizu, Ryuichi; and Ikuta, Takashi, to Research Development Corporation of Japan. Scan line type dynamic observation apparatus. 4,713,687, Cl. 358-138.000.
Shimizu, Yoshishige: *See*—
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Shini, Masami, to Fuji Kagakushi Kogyo Co., Ltd. Multiple-use pressure-sensitive transfer recording media. 4,713,281, Cl. 428-207.000.
Shinkawa, Keiro: *See*—
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Okuzono, Shuichi; Tanaka, Tetsuo; Oda, Yasuhiro; Shintani, Takashi; and Emura, Noriaki, 4,713,083, Cl. 8-557.000.
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Shionogi & Co., Ltd.: *See*—
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Sakamoto, Teruo; Kawai, Sadao; Noda, Kinzaburo; Takeda, Toyohiko; and Kato, Hiroshi, 4,713,247, Cl. 424-461.000.
Wakisaka, Yoshiharu; Uo, Junko; Matsumoto, Kouichi; Ohodaira, Osamu; and Tanaka, Kentaro, 4,713,241, Cl. 424-93.000.
Shiozawa, Iwamitsu: *See*—
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Shirasaki, Masataka, to Fujitsu Limited. Polarization rotation compensator and optical isolator using the same. 4,712,880, Cl. 350-377.000.
Shiratori Pharmaceutical Co., Ltd.: *See*—
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Okamoto, Masayoshi; Suzuki, Katsuhisa; Hoshino, Ryoichi; and Sasaki, Hironaka, 4,712,612, Cl. 165-146.000.
Shuch, Howard P. Binaural doppler collision alert system for general aviation aircraft. 4,713,669, Cl. 342-455.000.
Shurtz, Richard R., II; and Sharp, Edward J., to United States of America, Army. Birefringent artificial dielectric structures. 4,712,881, Cl. 350-406.000.
Shute, Jonathan F.; and Rosenhouse, Harvey, to FMC Corporation. Heat recovery in the manufacture of phosphorus acids. 4,713,228, Cl. 423-317.000.
Sibalis, Dan, to Drug Delivery Systems Inc. Applicator for non-invasive transcutaneous delivery of medicament. 4,713,050, Cl. 604-20.000.
Sidney Rich Associates, Inc.: *See*—
Sigoloff, Jerome A., 4,712,314, Cl. 36-112.000.
Siegel, Bernard: *See*—
Gille, Henrick K.; Willing, Richard S.; Bloom, William G.; Siegel, Bernard; Cheung, Tsang; Lobodzinski, Richard; and Gilroy, Keith, 4,712,567, Cl. 128-771.000.
Siegel, Richard C.; Marx, Christina S.; Hargitay, Bartholomew; and Wotherspoon, Neil, to Technicon Instruments Corporation. Hydrophilic assay reagent containing one member of specific binding pair. 4,713,350, Cl. 436-533.000.
Siemens Aktiengesellschaft: *See*—
Adam, Peter; and Michel, Peter, 4,713,568, Cl. 310-112.000.
Bachel, Ernst; and Giebel, Wolfgang, 4,713,272, Cl. 428-36.000.
Becker, Michael; and Renz, Klaus, 4,713,604, Cl. 324-500.000.
Feuerbaum, Hans-Peter; Frosien, Juergen; and Spehr, Rainer, 4,713,543, Cl. 250-310.000.
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Kimpel, Rolf D., 4,713,727, Cl. 361-334.000.
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Simonetti, John J., to Sangamo Weston, Inc. High temperature plastic scintillators. 4,713,198, Cl. 252-301.170.
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Small, Irwin A. Method of applying a chin implant, drill guide tool and implant. 4,713,077, Cl. 623-16.000.

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Smidek, Otakar, to Von Roll AG. Elevator for transporting people and goods with an annular travelling cabin. 4,712,652, Cl. 187-1.00R.
Smit, Francis J.; Horst, William E.; and Bhasin, Anirudh K., to Amax Inc. Oil-compatible coal/water mixtures. 4,713,086, Cl. 44-51.000.
Smit, Gerard C., to Smitdesign B.V. Reservoir filling arrangement for a coffee machine. 4,713,526, Cl. 219-332.000.
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Smith, Darren A.; and Thompson, Ian R., to Orbital Engine Company Proprietary Limited. Fuel injection system. 4,712,524, Cl. 123-198.00A.
Smith, David J., to Amoco Corporation. Electrodeposition of lithium. 4,713,151, Cl. 204-58.500.
Smith, David V. Wire tag etching system. 4,713,315, Cl. 430-326.000.
Smith, Edgar M., to RCA Corporation. Power supply associated with AC line relay switch. 4,713,598, Cl. 323-245.000.
Smith, Eugene A., to Northrop Corporation. Pre-combustion integrated Ram airbreathing laser. 4,713,823, Cl. 372-90.000.
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Smith, Ian K., to Solmecs Corporation N.V. Utilization of thermal energy. 4,712,380, Cl. 60-641.200.
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Smith, Randall C. Power amplifier with modified dynamic response. 4,713,624, Cl. 330-118.000.
Smith, Roderick L., to Energy Adaptive Grinding, Inc. Centerless and center-type grinding system. 4,712,332, Cl. 51-103.0WH.
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SMS Concast Inc.: *See*—
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Gely, Jean-Marie L.; Goutines, Marius J.; and Meauze, Geordes, 4,712,980, Cl. 416-224.000.
Soda, Yutaka; Imamura, Hideko; Uchida, Hiroyuki; and Sekiya, Tetsuo, to Sony Corporation. Compact multiple magnetic head apparatus. 4,713,710, Cl. 360-121.000.
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Solomon, Donald D., to Becton, Dickinson and Company. Process for preparing antithrombogenic/antibiotic polymeric plastic materials. 4,713,402, Cl. 523-112.000.
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Solstad, Russell V.; Scott, Millard; and Holliday, William, to VTC Incorporated. Burn-in apparatus for integrated circuits mounted on a carrier tape. 4,713,611, Cl. 324-158.00F.
Soma, Keiji, to Hirose Electric Co., Ltd. Electric connector for multi-conductor flat cables. 4,713,025, Cl. 439-752.000.
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Sommer, Hans-Jorg; Mutter, Heinz; Wirz, Armin; and Graf, Felix, to Rieter Machine Works, Ltd. Method of monitoring the quality of a package of thread. 4,713,655, Cl. 340-677.000.
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Southworth, Glen R.; and Cornilsen, Robert J., to Colorado Video, Incorporated. Composite single video image system and method utilizing video peak storing memory. 4,713,693, Cl. 358-160.000.
Sowell, Gene H. Athletic shoe. 4,712,317, Cl. 36-133.000.
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Sparling, Kenneth P.; Incardona, Angelo; Kikendall, Garth D.; Richardson, David G.; Wood, Ronald E.; and Bakow, Leon, to Lockheed Corporation. Controlled expansion flush-head rivet design and method of installing same. 4,712,958, Cl. 411-506.000.
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Messerschmidt, Robert G., 4,712,912, Cl. 356-73.000.
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Spilker, Harry; Rox, Rainer; and Peschl, Heinz-Walter. Depository for radioactive waste and spent fuel cells. 4,713,199, Cl. 252-633.000.
Spivack, John D.; Steinberg, David H.; and Odorisio, Paul A., to Ciba-Geigy Corporation. Long chain (4-hydroxyphenyl) propanoate stabilizers. 4,713,475, Cl. 560-75.000.
Spring, David J., to Graviner Limited. Cooling apparatus. 4,713,101, Cl. 62-8.000.
Square D Starkstrom GmbH: *See*—
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Ludwig, Bernd; and Stiehl, Dirk, 4,713,498, Cl. 200-5.00R.
Srinivasan, Vadake R.; Cary, Jeffrey W.; Chon, Younghae; and Narva, Kenneth E., to Research Corporation Technologies, Inc. Gene for lignin degradation and uses thereof. 4,713,336, Cl. 435-155.000.
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Staerzl, Richard E., to Brunswick Corporation. Engine idle stabilization timing circuit. 4,712,527, Cl. 123-418.000.
Stairs, Henry M., Jr., to American Standard Inc. Cover plate and mounting clip assembly. 4,712,256, Cl. 4-661.000.
Stamm, Wolfgang; and Konig, Dieter, to Bayerische Motoren Werke Aktiengesellschaft. Installation for the automatic grinding of curved surfaces. 4,712,289, Cl. 29-568.000.
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LaDue, Philip G.; and Peglow, James D., 4,712,935, Cl. 400-645.100.
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Epstein, Ronald A., 4,713,484, Cl. 562-406.000.
Michel, Christian G.; Schachter, Rozalie; Kuck, Mark A.; Baumann, John A.; and Raccah, Paul M., 4,713,192, Cl. 252-62.30R.
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Overbury, Francis G.; Ward, Christopher R.; and Searle, Jeffrey G., 4,713,668, Cl. 342-384.000.
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Step On Inc.: *See*—
Ritten, Robert G., 4,712,503, Cl. 114-343.000.
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Steppe, Dennis L.; Hood, Larry L.; and Boggs, Gary D., to CooperVision, Inc. Cassette for surgical irrigation and aspiration and sterile package therefor. 4,713,051, Cl. 604-30.000.
Stern, Marvin J., to Alloy Metals, Inc. Nickel base brazing alloy and method. 4,713,217, Cl. 420-452.000.
Stevanato, Giovanni, to Vecta Glass Company Ltd. Ready to use syringe. 4,713,062, Cl. 604-203.000.
Stevens, Vernon C., to Ohio State University Research Foundation, The. Antigenic modification of polypeptides. 4,713,366, Cl. 514-13.000.
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Stockton, Thomas R., to Ford Motor Company. Non-lubricated drive belt system for a continually variable transmission. 4,713,041, Cl. 474-28.000.
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Stone, Wayne B., Jr., to Wood Manufacturing. Float activated siphon for automatic drip coffee maker. 4,713,253, Cl. 426-433.000.
Stoneman, Everett L., to Rohr Industries, Inc. Jaw alignment pin for a stretch jaw chuck. 4,712,831, Cl. 279-123.000.
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Sugama, Takayuki; Tabata, Hiroshi; and Honda, Tadanori, to Honda Giken Kogyo Kabushiki Kaisha. Lock structure for seat slide device. 4,712,759, Cl. 248-429.000.
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Sugimoto, Hiroaki; Hayatsu, Kazuo; and Fujiwara, Masahiro, to Sumitomo Chemical Company, Limited. Process for producing aromatic polyester. 4,713,435, Cl. 528-179.000.
Sugimoto, Tadao; and Hayakawa, Toshiaki, to Fuji Photo Film Co., Ltd. Core/shell silver halide photographic emulsion and method for production thereof. 4,713,318, Cl. 430-567.000.
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Sumoto, Kunihiro: *See*—
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Sun, Yichang. Exhaust silencer for internal combustion engines. 4,712,644, Cl. 181-251.000.
Sunano, Naomasa; Asahi, Naotatsu; and Yoshida, Toshio, to Shinyei Kaisha; and Hitachi, Ltd. Gas sensor and method of producing the same. 4,713,646, Cl. 338-34.000.
Sunbuichi, Hiroshi: *See*—
Terasaka, Katsunori; Sunbuichi, Hiroshi; and Nakagawa, Toyoaki, 4,712,529, Cl. 123-492.000.

Sundermeier, Gunter, to Paul Hettich GmbH & Co. Mounting plate for a furniture hinge which is adjustable in height. 4,712,271, Cl. 16-238.000.

Sundstrand Corporation: *See—*
Avny, Eli, 4,712,449, Cl. 74-710.500.
Crowe, Lawrence E., 4,712,384, Cl. 62-225.000.

Sundstrand Data Control, Inc.: *See—*
Peters, Rex B., 4,712,426, Cl. 73-505.000.
Peters, Rex B., 4,712,427, Cl. 73-517.0AV.

Sundstrom, Inge: *See—*
Legerius, Bengt E.; and Sundstrom, Inge, 4,712,342, Cl. 52-221.000.

Sunkist Growers, Inc.: *See—*
Borgman, Bradley N.; Cramer, Jerry W.; and Dossey, Don E., 4,712,818, Cl. 294-64.100.

Suntori Limited: *See—*
Tatsuoka, Toshio; Suzuki, Kenji; Imao, Kayoko; Satoh, Fumio; Miyano, Seiji; and Sumoto, Kunihiro, 4,713,453, Cl. 544-60.000.

Suntory Limited: *See—*
Sakai, Hideaki; and Kanai, Tadashi, 4,713,454, Cl. 544-258.000.

Super Tool and Mfg. Corporation: *See—*
Memmel, Lawrence C., 4,713,592, Cl. 318-565.000.

Survival Technology, Inc.: *See—*
Tarello, William R.; Gordon, Linda A.; and Whalen, T. Daniel, 4,713,061, Cl. 604-200.000.

Susak, David M.; and Vyne, Robert L., to Motorola Inc. Operational amplifier utilizing JFET followers. 4,713,626, Cl. 330-253.000.

Sutterlin, Norbert; Blitz, Hans-Dieter; Mager, Theodor; Jagsch, Karl-Heinz; and Tessmer, Dieter, to Rohm GmbH Chemische Fabrik. Continuous emulsion polymerization process. 4,713,434, Cl. 526-62.000.

Sutton, Quinten H., to RTE Corporation. Sliding current interchange. 4,713,018, Cl. 439-185.000.

Suyama, Tadakazu: *See—*
Yokoyama, Kazumasa; Fukaya, Chikara; Tsuda, Yoshio; Ono, Taizo; Arakawa, Yoshio; and Suyama, Tadakazu, 4,713,459, Cl. 546-150.000.

Suzuki, Hitomi: *See—*
Takayama, Shigehiko; Suzuki, Hitomi; Maruyama, Masanori; Fukushima, Masakazu; and Kurashige, Mitsuhiro, 4,713,588, Cl. 315-382.000.

Suzuki, Kaoru, to Tokyo Shibaura Denki Kabushiki Kaisha. Processor and method of processing image data. 4,713,789, Cl. 364-724.000.

Suzuki, Katsuhisa: *See—*
Okamoto, Masayoshi; Suzuki, Katsuhisa; Hoshino, Ryoichi; and Sasaki, Hironaka, 4,712,612, Cl. 165-146.000.

Suzuki, Kenji: *See—*
Tatsuoka, Toshio; Suzuki, Kenji; Imao, Kayoko; Satoh, Fumio; Miyano, Seiji; and Sumoto, Kunihiro, 4,713,453, Cl. 544-60.000.

Suzuki Motor Company Limited: *See—*
Takahashi, Ken; Hirata, Chiaki; and Ishioka, Yuji, 4,712,629, Cl. 180-68.100.

Suzuki, Nitaro: *See—*
Ogawa, Takayuki; Ito, Hideaki; Kimura, Naokazu; Ito, Hayami; Tatsami, Shuhei; Takao, Shoichi; Suzuki, Nitaro; Watanabe, Takashi; Shinano, Kunizo; Kuwabara, Takashi; and Aoki, Kaoru, 4,712,742, Cl. 241-20.000.

Suzuki, Nobuyuki; Shimizu, Masao; and Katsuragawa, Mitsuhiro, to Canon Kabushiki Kaisha. Driving circuit of a vibration wave motor. 4,713,571, Cl. 310-316.000.

Suzuki, Shinichi: *See—*
Inagaki, Mitukane; Ohta, Masaki; Hyodo, Akihiko; Takenaka, Kenji; Mitibata, Takashi; Suzuki, Shinichi; and Kayukawa, Hiroaki, 4,712,982, Cl. 417-222.000.

Suzuki, Takahisa; Kuwahara, Shinichi; and Kawashima, Yoshinori, to Honda Giken Kogyo Kabushiki Kaisha. Motor vehicle with handlebar. 4,712,633, Cl. 180-149.000.

Suzuki, Takatoshi: *See—*
Matsuyama, Kiyoshi; Suzuki, Takatoshi; and Chigusa, Takeshi, 4,713,444, Cl. 528-502.000.

Suzuki, Takeshi, to NEC Corporation. Telephone set structure having a member capable of being inserted in invertible position. 4,713,836, Cl. 379-58.000.

Suzuki, Yoshiaki: *See—*
Mifune, Hiroyuki; Shishido, Tadao; and Suzuki, Yoshiaki, 4,713,321, Cl. 430-569.000.

Suzuki, Yukio: *See—*
Ogiue, Katsumi; Suzuki, Yukio; Masuda, Ikuro; Odaka, Masanori; and Uchida, Hideaki, 4,713,796, Cl. 365-189.000.

Svahn, Bror G. K.: *See—*
Isaksson, Karl B.; and Svahn, Bror G. K., 4,712,952, Cl. 408-211.000.

Swanson Brothers, Inc.: *See—*
Swanson, Elrod H., 4,712,833, Cl. 297-219.000.

Swanson, Elrod H., to Swanson Brothers, Inc. Seat cushion for preventing slouching of an infant or weakened adult. 4,712,833, Cl. 297-219.000.

Swanson, Wilbur W.: *See—*
Cameron, Thomas B.; Swanson, Wilbur W.; Tartaglia, John M.; and Cox, Thomas B., 4,713,111,.Cl. 75-68.00R.

Sweany, Ralph S. Shaft speed monitor. 4,713,654, Cl. 340-671.000.

Swedish Graft Technique AB: *See—*
Bowald, Staffan F., 4,713,072, Cl. 623-6.000.

Sweeney, Ronald M.: *See—*
Rimmer, James R.; and Sweeney, Ronald M., 4,712,358, Cl. 53-450.000.

Swilley, Dennis N. Chair with interlocking multiple components. 4,712,837, Cl. 297-442.000.

Swinton, Andrew D. Apparatus for providing a visual interpretation of an audio signal. 4,713,658, Cl. 340-815.110.

Sycha, Alec B.: *See—*
Bardsley, Frank B.; and Sycha, Alec B., 4,712,846, Cl. 439-33.000.

Symington, John M.; and Listrom, Robin D., to University of Toronto Innovations Foundation. Fixture for attaching prosthesis to bone. 4,713,003, Cl. 433-173.000.

Symon, Georg: *See—*
Graf, Felix; Schneeberger, Ruedi; and Symon, Georg, 4,712,746, Cl. 242-43.00R.

Syntex (U.S.A.) Inc.: *See—*
Pascal, Jean-Claude, 4,713,382, Cl. 514-255.000.
Ullman, Edwin F., 4,713,348, Cl. 436-501.000.

Szczesny, Paul M.: *See—*
Bose, Bimal K.; and Szczesny, Paul M., 4,713,594, Cl. 318-685.000.

Szelke, Michael; Jones, David M.; and Hallett, Allan, to Aktiebolaget Hassle. Renin inhibitors and treatments using them. 4,713,445, Cl. 530-330.000.

Szporny, Laszlo: *See—*
Ezer, Elemer; Harsanyi, Kalman; Petho, Hajnalka V.; Matuz, Judit; Szporny, Laszlo; Cholnoky, Eszter; Kuthi, Csaba; Trischler, Ferenc; Hegedus, Bela; Kapolnas, Marta; and Kallay, Anna, 4,713,388, Cl. 514-346.000.

Szymski, Eugene J., to Schwinn Bicycle Company. Cycle exerciser. 4,712,790, Cl. 272-73.000.

TAA Technique and Administration AG: *See—*
Frank, Wolfgang, 4,713,032, Cl. 441-74.000.

Tabata, Hiroshi: *See—*
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Tachikawa Corporation: *See—*
Komaki, Toshiro, 4,712,599, Cl. 160-133.000.

Tachikawa, Hajime: *See—*
Nakamura, Hiro; Ohkawa, Shuji; Ohtsuka, Yasuo; Tachikawa, Hajime; and Shinozaki, Toshiya, 4,712,970, Cl. 414-730.000.

Tack, Robert D.; and Pearce, Sarah L., to Exxon Chemical Patents Inc. Middle distillate compositions with improved cold flow properties. 4,713,088, Cl. 44-62.000.

Tae-Ho, Suh, to Fritz Chemical Company. Expandable wand pet toy. 4,712,510, Cl. 119-29.000.

Taguchi, Hiromi, to Nissan Motor Co., Ltd. Cap mounting structure of the governor valve for automatic transmission. 4,712,708, Cl. 220-319.000.

Taillebois, Jacques: *See—*
Renaud, Jean-Marie; Gambs, Paul; Perrot, Jean-Claude; and Taillebois, Jacques, 4,713,541, Cl. 250-231.0SE.

Taiyo Yuden Kabushiki Kaisha: *See—*
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Tajima, Yoshihisa: *See—*
Takahashi, Katsuhiko; and Tajima, Yoshihisa, 4,713,408, Cl. 524-161.000.

Takagi, Hiroyasu: *See—*
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Takahashi, Hiromi: *See—*
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Takahashi, Katsuhiko; and Tajima, Yoshihisa, to Polyplastics Co., Ltd. Polybutylene terephthalate resin composition. 4,713,408, Cl. 524-161.000.

Takahashi, Kazuo: *See—*
Namba, Kenryo; Asami, Shigeru; Aoi, Toshiki; Takahashi, Kazuo; and Kuroiwa, Akihiko, 4,713,314, Cl. 430-270.000.

Takahashi, Ken; Hirata, Chiaki; and Ishioka, Yuji, to Suzuki Motor Company Limited. Engine and drive belt cooling system for an all terrain vehicle. 4,712,629, Cl. 180-68.100.

Takahashi, Mitsuru: *See—*
Nakamura, Makoto; Takahashi, Mitsuru; Osawa, Namieki; and Murakami, Yuichi, 4,713,044, Cl. 474-135.000.

Takahashi, Nobuyuki: *See—*
Fujiwara, Norio; Takahashi, Nobuyuki; and Otsuki, Akihiro, 4,713,279, Cl. 428-142.000.

Takahashi, Tadashi; Miyashita, Kunio; and Kawamata, Syooichi, to Hitachi, Ltd. Device for magnetically detecting displacement of non-magnetic movable member. 4,713,613, Cl. 324-208.000.

Takahashi, Teruomi; and Sato Tadashi, to Canon Kabushiki Kaisha. Write-in electronic display recorder. 4,713,698, Cl. 358-296.000.

Takamine, Henry, to Hughes Aircraft Company. Method and apparatus for determination of junction-to-case thermal resistance for a hybrid circuit element. 4,713,612, Cl. 324-158.00D.

Takamiya, Kikuzo; Ishibashi, Hideyuki; and Kozakae, Kunitoshi, to Bridgestone Cycle Co., Ltd. Stepless speed change device. 4,712,450, Cl. 74-750.00B.

Takanashi, Keinichi: *See—*
Sakuma, Nobuo; and Takanashi, Keinichi, 4,712,884, Cl. 350-434.000.

Takao, Hideaki: *See—*
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Takao, Shoichi: *See*—
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Takatsu, Haruyoshi; Sasaki, Makoto; Tanaka, Yasuyuki; and Sato, Hisato, to Dainippon Ink and Chemicals, Inc. Tolan-type nematic liquid crystalline compounds. 4,713,468, Cl. 558-411.000.

Takayama, Shigehiko; Suzuki, Hitomi; Maruyama, Masanori; Fukushima, Masakazu; and Kurashige, Mitsuhiro, to Hitachi, Ltd.; and Nippon Hoso Kyokai. Image pickup tube. 4,713,588, Cl. 315-382.000.

Takeda Riken Kogyo Kabushikikaisha: *See*—
Kasahara, Toshiharu; Ogami, Takayuki; and Kitayoshi, Hitoshi, 4,713,788, Cl. 364-718.000.

Takeda, Toyohiko: *See*—
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Takemura, Koichi; and Shiomi, Tadashi, to Kabushiki Kaisha Kamiuchi Denki Seisakusho. Detection device for contact fusion in an electromagnetic contactor. 4,713,716, Cl. 361-2.000.

Takemura, Tohru; Itoh, Hajime; Kamo, Jun; and Yoshida, Haruhiko, to Mitsubishi Rayon Co., Ltd. Multilayer composite hollow fibers and method of making same. 4,713,292, Cl. 428-373.000.

Takenaka, Kenji: *See*—
Inagaki, Mitukane; Ohta, Masaki; Hyodo, Akihiko; Takenaka, Kenji; Mitibata, Takashi; Suzuki, Shinichi; and Kayukawa, Hiroaki, 4,712,982, Cl. 417-222.000.

Taketa, Kazuhiko: *See*—
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Takeuchi, Junji: *See*—
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Takeuchi, Masami: *See*—
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Takeuchi, Yoshio; Koizumi, Toru; and Hori, Kozo, to Daikin Industries, Ltd. Fluorine-containing multifunctional ester compound. 4,713,469, Cl. 560-17.000.

Takiguchi, Isao, to Yazaki Corporation. Connecting structure for high voltage resistance wires. 4,713,015, Cl. 439-125.000.

Takimoto, Masahiro; Takeuchi, Junji; and Yamazaki, Yoshio, to Toyoda Gosei Co., Ltd. Thermoplastic olefin elastomer. 4,713,419, Cl. 525-211.000.

Takiron Co., Ltd.: *See*—
Miura, Masanobu, 4,713,579, Cl. 313-500.000.

Takoshima, Takehiro, to Alps Electric Co., Ltd. Thermal head. 4,713,671, Cl. 346-76.0PH.

Tamade, Yoshinori: *See*—
Uno, Kunihiko; Tamade, Yoshinori; Horino, Seiya; and Kodera, Tamotsu, 4,712,741, Cl. 241-16.000.

Tamaki, Sigeo: *See*—
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Tamhankar, Satish; and Weltmer, William R., to BOC Group, Inc., The. One-step process for purifying an inert gas. 4,713,224, Cl. 423-219.000.

Tamura, Sadahiro: *See*—
Nishikawa, Toshio; and Tamura, Sadahiro, 4,713,632, Cl. 331-117.00D.

Tanabe, Tohru, to Rhythm Watch Company Limited. Electronic timepiece. 4,712,926, Cl. 368-251.000.

Tanaka, Atsuo: *See*—
Hamajima, Kaneo; Dohnomoto, Tadashi; Tanaka, Atsuo; and Kubo, Masahiro, 4,712,600, Cl. 164-97.000.

Tanaka, Fumihiro; Shimada, Yoshio; Yamaguchi, Kaneo; Matsushima, Kenichi; and Watanabe, Shinya, to Seiko Instruments & Electronics Ltd. Interface circuit of video signal hard copy apparatus. 4,713,691, Cl. 358-148.000.

Tanaka, Fumihiro: *See*—
Watanabe, Shinya; Tanaka, Fumihiro; Yamaguchi, Kaneo; Shimada, Yoshio; and Matsushima, Kenichi, 4,713,690, Cl. 358-148.000.

Tanaka, Hideo: *See*—
Torii, Sigeru; Tanaka, Hideo; Sasaoka, Michio; Uto, Seiryu; and Hayase, Syozo, 4,713,452, Cl. 540-358.000.

Tanaka, Kentaro: *See*—
Wakisaka, Yoshiharu; Uo, Junko; Matsumoto, Kouichi; Ohodaira, Osamu; and Tanaka, Kentaro, 4,713,241, Cl. 424-93.000.

Tanaka, Tetsuo: *See*—
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Tanaka, Yasuyuki: *See*—
Takatsu, Haruyoshi; Sasaki, Makoto; Tanaka, Yasuyuki; and Sato, Hisato, 4,713,468, Cl. 558-411.000.

Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, to Minolta Camera KK. Camera system. 4,712,904, Cl. 354-475.000.

Taniguchi, Osamu; Okada, Shinjiro; and Ando, Yujiro, to Canon Kabushiki Kaisha. Color image forming apparatus comprising ferroelectric smectic liquid crystal having at least two stable states. 4,712,878, Cl. 350-350.00S.

Tanii, Junichi; and Maekawa, Yukio, to Minolta Camera Kabushiki Kaisha. Positioning mechanism for positioning auxiliary optical device relative to main optical device and the auxiliary optical device. 4,712,871, Cl. 350-257.000.

Tappen, Gerhard: *See*—
Grill, Hans; and Tappen, Gerhard, 4,712,691, Cl. 211-49.100.

Tarassoff, Serge, to Pomagalski S.A. Aerial ropeway transport installation with the rope stopping to detach the cars in the terminal. 4,712,486, Cl. 104-173.100.

Tarello, William R.; Gordon, Linda A.; and Whalen, T. Daniel, to Survival Technology, Inc. Cartridge with universal plastic hub. 4,713,061, Cl. 604-200.000.

Tartaglia, John M.: *See*—
Cameron, Thomas B.; Swanson, Wilbur W.; Tartaglia, John M.; and Cox, Thomas B., 4,713,111, Cl. 75-68.00R.

Tarver, Carl R.: *See*—
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Taschner, Klaus: *See*—
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Tatsumi, Shuhei: *See*—
Ogawa, Takayuki; Ito, Hideaki; Kimura, Naokazu; Ito, Hayami; Tatsumi, Shuhei; Takao, Shoichi; Suzuki, Nitaro; Watanabe, Takashi; Shinano, Kunizo; Kuwabara, Takashi; and Aoki, Kaoru, 4,712,742, Cl. 241-20.000.

Tatsuoka, Toshio; Suzuki, Kenji; Imao, Kayoko; Satoh, Fumio; Miyano, Seiji; and Sumoto, Kunihiro, to Suntori Limited. Oxabicycloheptane derivatives. 4,713,453, Cl. 544-60.000.

Taylor, Arthur R.; and Wulfekotter, Dudley, to Formica Corporation. Modified melamine resin for use in decorative laminates. 4,713,299, Cl. 428-526.000.

Taylor, John W., Jr., to Westinghouse Electric Corp. Point clutter threshold determination for radar systems. 4,713,664, Cl. 342-91.000.

Taylor, Leo O.: *See*—
Dawson, Christopher; Healey, Fritz W.; and Taylor, Leo O., 4,712,885, Cl. 350-443.000.

Taylor, Lloyd D.: *See*—
Bartels-Keith, James R., deceased; Puttick, Anthony J.; and Taylor, Lloyd D., 4,713,313, Cl. 430-251.000.

Taylor, William: *See*—
Peters, Rudolph; Peters, Ronald; and Taylor, William, 4,712,549, Cl. 128-325.000.

Taylor, William W., Jr.: *See*—
Clarkson, Bruce A.; Frere, Ronald J.; Loughlin, Thomas G.; Taylor, William W., Jr.; and Mongeau, Peter, 4,712,398, Cl. 70-276.000.

TDK Corporation: *See*—
Namba, Kenryo; Asami, Shigeru; Aoi, Toshiki; Takahashi, Kazuo; and Kuroiwa, Akihiko, 4,713,314, Cl. 430-270.000.
Yoda, Kuniichi; Kitaura, Eiji; Tsunoda, Tsutomu; and Kawakami, Yoshio, 4,713,278, Cl. 428-141.000.

Technal International S.A.: *See*—
Marcusse, Alain; and Pinel, Max, 4,712,337, Cl. 52-90.000.

Technicon Instruments Corporation: *See*—
Fox, John P.; Hedaya, Eddie; and Lippman, Violet, 4,713,324, Cl. 435-4.000.
Siegel, Richard C.; Marx, Christina S.; Hargitay, Bartholomew; and Wotherspoon, Neil, 4,713,350, Cl. 436-533.000.

Technisch Ontwikkelingsbureau van Elten B.V.: *See*—
van Elten, Gerrit J.; Hurkmans, Antonius; and de Vries, Hugo V., 4,712,964, Cl. 414-281.000.

Technology for Energy Corporation: *See*—
Hunter, Brook L.; Rizzie, Joseph W.; and Ward, Marvin L., 4,712,847, Cl. 439-155.000.

Tecma Laboratories, Inc.: *See*—
Trenzeluk, Theodore, 4,713,242, Cl. 424-145.000.

Tecumseh Products Company: *See*—
Campen, Kenneth W., 4,712,521, Cl. 123-149.00C.

Teepak, Inc.: *See*—
Bridgeford, Douglas J., 4,713,135, Cl. 156-218.000.

Tegge, Bruce R.; Weary, Frank G.; and Sakaguchi, Yasuo, to Exxon Chemical Patents Inc. Removal of organic halides from hydrocarbon solvents. 4,713,413, Cl. 525-54.000.

Teknowledge, Incorporated: *See*—
Scott, A. Carlisle; Clayton, Jan E.; and Garnier, Jacques, 4,713,775, Cl. 364-513.000.

Tektronix, Inc.: *See*—
Addis, John L., 4,713,627, Cl. 330-306.000.
Crop, Roland E., 4,713,771, Cl. 364-487.000.
Pepper, Steven H., 4,713,607, Cl. 324-73.0PC.
Van Nice, H. Lee; Bostwick, Myron A., Jr.; and Kongslie, Keith F., 4,713,520, Cl. 219-121.0LC.

Teleflex Incorporated: *See*—
Niskanen, Don L., 4,712,397, Cl. 70-248.000.

Telschow, Jeffrey E.; and Bright, Danielle A., to Stauffer Chemical Company. Process for production of isothiocyanates. 4,713,467, Cl. 558-18.000.

Temburg, Josef: *See*—
Hosel, Fritz; Marx, Hans-Jurgen; and Temburg, Josef, 4,712,275, Cl. 19-80.00R.

Temes, Gabor C.; and Wang, Fong J., to Xerox Corporation. Pipelined digital-to-analog converter. 4,713,650, Cl. 340-347.0DA.

Tempaku, Junya: *See*—
Nakamura, Haruhiko; and Tempaku, Junya, 4,713,621, Cl. 328-55.000.

Temple, Robert B.; and Colpaert, James J., to Allied Corporation. Brake assembly with multiple adjustability. 4,712,654, Cl. 188-71.800.

Tenhaven, Ulrich: *See*—
Bersch, Bernhard; Juttner, Heinz; and Tenhaven, Ulrich, 4,713,519, Cl. 219-121.0LC.

Tennant, William A.: *See*—
Kudert, Frederick G.; Latreille, Maurice G.; McHenry, Robert J.; Nahill, George F.; Pfutzenreuter, Henry, III; Tennant, William A.; Tung, Thomas T.; and Vella, John, Jr., 4,712,990, Cl. 425-130.000.

Teraoka, Masao, to Tochigifujisangyo Kabushikigaisha. Viscous coupling for a drive shaft. 4,712,663, Cl. 192-58.00A.

Terasaka, Katsunori; Sunbuichi, Hiroshi; and Nakagawa, Toyoaki, to Nissan Motor Co., Ltd. Air-fuel ratio control for transient modes of internal combustion engine operation. 4,712,529, Cl. 123-492.000.

Terasawa, Yoshio; and Oikawa, Saburo, to Hitachi, Ltd. Reverse blocking type semiconductor device. 4,713,679, Cl. 357-38.000.

Terumo Corporation: *See*—
Yamaguchi, Keiji, 4,712,564, Cl. 128-682.000.

Tesch, Klaus. Device for mutually centering and clamping two pipe bodies to be welded to one another. 4,712,720, Cl. 228-49.300.

Tessmer, Dieter: *See*—
Sutterlin, Norbert; Blitz, Hans-Dieter; Mager, Theodor; Jagsch, Karl-Heinz; and Tessmer, Dieter, 4,713,434, Cl. 526-62.000.

Tetra Pak Finance & Trading S.A.: *See*—
Reil, Wilhelm; and Deutschbein, Ulrich, 4,713,048, Cl. 493-74.000.

Texaco Inc.: *See*—
Jenkins, Robert H., Jr.; Mitchell, Edward; Gaetani, Frank J.; Mahusky, John J.; and Hall, Marilyn, 4,713,087, Cl. 44-53.000.
Nalesnik, Theodore E.; and Benfaremo, Nicholas, 4,713,189, Cl. 252-51.50A.
Nalesnik, Theodore E., 4,713,191, Cl. 252-51.50A.

Texas Instruments: *See*—
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Texas Instruments Incorporated: *See*—
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Magar, Surendar S.; and Essig, Daniel L., 4,713,749, Cl. 364-200.000.
Mitchell, Allan T.; and Paterson, James L., 4,713,142, Cl. 156-653.000.
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Womack, Richard H.; Banerjee, Sanjay K.; Shichijo, Hisashi; and Malhi, Satwinder, 4,713,678, Cl. 357-23.600.

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Ryder, Francis E.; and Lisak, Stephen P., 4,713,739, Cl. 362-424.000.

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Howland, Leland L.; and Seshadri, Jayaram, 4,712,383, Cl. 62-200.000.

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Antos, John M.; and Selina, John R., 4,712,255, Cl. 4-323.000.

Thiel, Gerhard: *See*—
Pilz, Georg; Buerger, Gert; Barl, Manfred; and Thiel, Gerhard, 4,713,201, Cl. 260-501.170.
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Thomas, Alain: *See*—
Servel, Michel; and Thomas, Alain, 4,713,804, Cl. 370-68.000.

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Bruno, Robert; Kipperman, Stuart R.; Mayer, Geoffrey R.; and Thomas, Michael, 4,713,064, Cl. 604-257.000.

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Johnson, Fred L., 4,712,518, Cl. 123-48.00B.

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Smith, Darren A.; and Thompson, Ian R., 4,712,524, Cl. 123-198.00A.

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Chang, Michael N.; Thompson, Kathryn L.; and Boulton, David A., 4,713,393, Cl. 514-469.000.

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Metz, Pierre; and Antonicelli, Marc, 4,712,747, Cl. 244-3.220.

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Drabowitch, Serge; Baril, Michel; and Le Parquier, Guy, 4,713,663, Cl. 342-70.000.
Poux, Jean P., 4,713,666, Cl. 342-152.000.

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French, Steven J.; and Neasham, David L., 4,713,652, Cl. 340-652.000.

Thorn, Richard, to Den norske stats oljeselskap a.s. Apparatus for the measurement of the fraction of gas in a two-component fluid flow comprising a liquid and a gas in mixture. 4,713,603, Cl. 324-61.00P.

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Legerius, Bengt E.; and Sundstrom, Inge, 4,712,342, Cl. 52-221.000.

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Tien, Zu-Jean, to International Business Machines Corporation. Laser luminescence monitor for material thickness. 4,713,140, Cl. 156-626.000.

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Lalikos, James M.; and Waite, Harold K., 4,712,642, Cl. 181-207.000.

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Teraoka, Masao, 4,712,663, Cl. 192-58.00A.

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Ambrosio, Renato; Brosio, Alberto; Fausone, Alfredo; and Tofanelli, Adler, 4,713,803, Cl. 370-32.100.

Tojo, Yu: *See*—
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Aso, Hideo; Fujino, Hirohisa; and Saibe, Seiichi, 4,712,493, Cl. 112-112.000.

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Kamiyama, Kiichi; and Kato, Yasuo, 4,712,895, Cl. 351-243.000.
Nunokawa, Kazuo, 4,712,894, Cl. 351-208.000.

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Komatsu, Michiyasu, 4,713,302, Cl. 428-698.000.
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Hirama, Shinichi; Nishiyama, Toshio; Ohta, Youichi; Uzuka, Makoto; Tomita, Kenichi; Nakajima, Keisuke; and Furuse, Kazumaro, 4,713,397, Cl. 514-690.000.

Tomkins, Keith A.: *See*—
Edwards, Wayne; Nation, Richard V.; and Tomkins, Keith A., 4,712,957, Cl. 411-82.000.

Tone, Hirosada, to Fujitsu Limited. Buffer storage system. 4,713,752, Cl. 364-200.000.

Tong, Duncan, to Duncan Products Ltd. Swimming marine creature toys. 4,713,037, Cl. 446-158.000.

Tonyes, Henry J.; Keehn, William T.; German, Harold W.; and Hill, Brian S., to Gaines Pet Foods Corp. Dog food palatability enhancer and process. 4,713,250, Cl. 426-2.000.

Top Driver Enterprise Co., Ltd.: *See*—
Yuan, Lo J., 4,712,456, Cl. 81-473.000.

Topfl, Rosemarie; and Abel, Heinz, to Ciba-Geigy Corporation. Maleic or phthalic acid half esters of alkoxylated fatty amines. 4,713,482, Cl. 560-196.000.

Torcon Products, Inc.: *See*—
Coston, David B., 4,713,744, Cl. 363-160.000.

Torii, Hisatsugu, to Fuji Photo Film Co., Ltd. Exposure mask for micro camera. 4,712,911, Cl. 355-74.000.

Torii, Sigeru; Tanaka, Hideo; Sasaoka, Michio; Uto, Seiryu; and Hayase, Syozo, to Otsuka Kagaku Kabushiki Kaisha. Process for preparation of azetidinone derivatives. 4,713,452, Cl. 540-358.000.

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Toshiba Tungaloy Co., Inc.: *See*—
Ikezaki, Yasuo; Matsuoka, Tadashi; and Mitani, Kazuyuki, 4,712,334, Cl. 51-262.00A.

Tourneux, Etienne : *See*—
Gal, Jean-Yves; Chiapello, Jean-Michel; Peyrot, Martial; and Tourneux, Etienne , 4,713,156, Cl. 204-182.400.

Towae, Friedrich: *See*—
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Townsend, Greg M.; and DiPrizio, Giuseppe M., to Motorola Inc. Fast power-fail detector for power supplies with energy hysteresis. 4,713,553, Cl. 307-64.000.
Toyama Chemical Co., Ltd.: *See*—
Kuzuya, Fumio; and Endo, Hidetoshi, 4,713,376, Cl. 514-78.000.
Watanabe, Isao; Momonoi, Kaishu; Hiraiwa, Toru; Ono, Satoshi; Nakano, Joji; Nagumo, Katsuyuki; and Takagi, Hiroyasu, 4,713,387, Cl. 514-332.000.
Toyo Soda Manufacturing Co., Ltd.: *See*—
Okuzono, Shuichi; Tanaka, Tetsuo; Oda, Yasuhiro; Shintani, Takashi; and Emura, Noriaki, 4,713,083, Cl. 8-557.000.
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Toyoda Gosei Co., Ltd.: *See*—
Takimoto, Masahiro; Takeuchi, Junji; and Yamazaki, Yoshio, 4,713,419, Cl. 525-211.000.
Toyoda, Kenichi: *See*—
Nakashima, Seiichiro; Toyoda, Kenichi; Inagaki, Shigemi; and Otsuka, Kazuhisa, 4,712,972, Cl. 414-744.00R.
Toyomitsu Kogyo, Co., Ltd.: *See*—
Ikezaki, Yasuo; Matsuoka, Tadashi; and Mitani, Kazuyuki, 4,712,334, Cl. 51-262.00A.
Toyota Jidosha Kabushiki Kaisha: *See*—
Anzai, Katsushi; Harada, Osamu; Suematsu, Toshio; and Takeda, Yuji, 4,712,522, Cl. 123-179.00L.
Baika, Toyokazu; and Oonaka, Hidemi, 4,712,442, Cl. 74-467.000.
Buma, Shuuichi; and Horiyama, Osamu, 4,712,775, Cl. 267-220.000.
Hamajima, Kaneo; Dohnomoto, Tadashi; Tanaka, Atsuo; and Kubo, Masahiro, 4,712,600, Cl. 164-97.000.
Ikai, Tadayoshi; and Kamo, Takashi, 4,712,419, Cl. 73-116.000.
Kobayashi, Nobuyuki; Hattori, Takashi; Yagi, Katsunori; and Ito, Toshimitsu, 4,713,766, Cl. 364-431.050.
Kodama, Hisashi; and Okabe, Yoshio, 4,713,045, Cl. 474-135.000.
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Nagai, Toshinari; Masui, Takatoshi; Satou, Yasushi; and Katsuno, Toshiyasu, 4,712,373, Cl. 60-274.000.
Sato, Akira; Sato, Kazuo; Saito, Takaharu; Shima, Junkoh; Mizutani, Kansei; and Mikawa, Toshimasa, 4,713,767, Cl. 364-453.000.
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Tracy, David J.: *See*—
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Trapp, Hans G.: *See*—
Hofmann, Franz; Trapp, Hans G.; Rietzscher, Rolf; Otto, Jurgen; Kaettlitz, Wolfgang; and Trinki, Gerd, 4,713,180, Cl. 210-773.000.
Trast Enterprise S.r.l.: *See*—
Agostini, Fabrizio, 4,712,924, Cl. 368-76.000.
Trenzeluk, Theodore, to Tecma Laboratories, Inc. Skin therapeutic mixture containing eupatorium extract. 4,713,242, Cl. 424-145.000.
Trickel, Lorn L. Solar-energy-collecting structural unit and solar roof. 4,712,338, Cl. 52-90.000.
Trigon Packaging Systems Limited: *See*—
Craig, John P., 4,712,729, Cl. 229-72.000.
Triner, Irvin R.: *See*—
Bixler, Craig A.; and Triner, Irvin R., 4,713,023, Cl. 439-393.000.
Trinki, Gerd: *See*—
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Triplett, Charles S.; and Gray, John D. Non-penetrating roof system. 4,712,348, Cl. 52-408.000.
Trischler, Ferenc: *See*—
Ezer, Elemer; Harsanyi, Kalman; Petho, Hajnalka V.; Matuz, Judit; Szporny, Laszlo; Cholnoky, Eszter; Kuthi, Csaba; Trischler, Ferenc; Hegedus, Bela; Kapolnas, Marta; and Kallay, Anna, 4,713,388, Cl. 514-346.000.
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Troup, Cathryn H., executor: *See*—
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Troup, Edward M., deceased: *See*—
Wichman, William J.; and Troup, Edward M., deceased, 4,713,038, Cl. 446-168.000.
Truitt, Robert B.; and Junius, V. Bruce, to Fluid Mechanics. Compact and cleanable apparatus for preventing scale formation in liquid systems. 4,713,159, Cl. 204-197.000.
Truskolaski, Bernard S., to Minnesota Mining and Manufacturing Company. Decorative ribbon and sheet material. 4,713,267, Cl. 428-4.000.
Trutzschler GmbH & Co. KG: *See*—
Hosel, Fritz; Marx, Hans-Jurgen; and Temburg, Josef, 4,712,275, Cl. 19-80.00R.
TRW Inc.: *See*—
Brooks, Robert E., 4,712,888, Cl. 350-486.000.
Gardner, Neal F., 4,713,355, Cl. 437-31.000.
Wood, Ruey E., Jr., 4,712,940, Cl. 403-133.000.
Tsang, Chi-Hwa, to Intel Corporation. Anisotropic plasma etching of tungsten. 4,713,141, Cl. 156-643.000.
Tsubaki, Yasuhiro: *See*—
Hagiwara, Haruo; Tsukamoto, Hideo; and Tsubaki, Yasuhiro, 4,712,392, Cl. 68-18.00C.
Tsuboyama, Akira; Katagiri, Kazuharu; and Kanbe, Junichiro, to Canon Kabushiki Kaisha. Dimensions of spacer particles for a ferroelectric liquid crystal display. 4,712,875, Cl. 350-344.000.
Tsuboyama, Akira: *See*—
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Tsuda, Yoshio: *See*—
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Tsudakoma Corp.: *See*—
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Tsugaru, Kazunori; and Sugimoto, Yasuhiro, to Kabushiki Kaisha Toshiba. Level conversion circuit. 4,713,600, Cl. 323-351.000.
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Tsujimoto, Keizo; Katagiri, Takashi; Ichihashi, Eiji; and Otsubo, Hitoshi, to Nippon Ester Co., Ltd. Denier-mixed composite yarn, denier-mixed special thick and thin yarn, false twist yarn and denier-mixed shrinkage-mixed composite yarn. 4,712,366, Cl. 57-245.000.
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Hagiwara, Haruo; Tsukamoto, Hideo; and Tsubaki, Yasuhiro, 4,712,392, Cl. 68-18.00C.
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Tucker, Kevin M.; and Peeler, Donald, to Jobst Institute. Cervical collar. 4,712,540, Cl. 128-76.00R.
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Schaumberg, John P.; Hokanson, Gerard C.; French, James C.; Tunac, Josefino B.; and Underhill, Marjorie A., 4,713,372, Cl. 514-45.000.
Tung, Chi F.; and Coderre, James C., to Minnesota Mining and Manufacturing Company. Expanded retroreflective sheet material. 4,712,868, Cl. 350-105.000.
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Kudert, Frederick G.; Latreille, Maurice G.; McHenry, Robert J.; Nahill, George F.; Pfutzenreuter, Henry, III; Tennant, William A.; Tung, Thomas T.; and Vella, John, Jr., 4,712,990, Cl. 425-130.000.
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Turner, David W.; Dixon, Andrew J.; Gehring, Karl A.; and Keenlyside, Michael, to Kevex Corporation. X-ray source apparatus. 4,713,833, Cl. 378-119.000.
Turner, Paul F., to BSD Medical Corporation. Local current capacitive field applicator for interstitial array. 4,712,559, Cl. 128-422.000.
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Uchida, Hideaki: *See*—
Ogiue, Katsumi; Suzuki, Yukio; Masuda, Ikuro; Odaka, Masanori; and Uchida, Hideaki, 4,713,796, Cl. 365-189.000.
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Uemura, Hiroyuki: *See*—
Shimada, Masaru; Kawanishi, Toshiyuki; Murakami, Kakuji; Aruga, Tamotsu; and Uemura, Hiroyuki, 4,713,113, Cl. 106-22.000.
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Ullman, Edwin F., to Syntex (U.S.A.) Inc. Fluorescent multiparameter particle analysis. 4,713,348, Cl. 436-501.000.
Umeda, Takao; Ooishi, Kazuya; Igawa, Tatsuo; and Hori, Yasuro, to Hitachi, Ltd. Driving ferroelectric liquid crystal printers via short circuiting. 4,712,876, Cl. 350-350.00S.
Umeda, Takashi: *See*—
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Klein, Herbert H., 4,712,696, Cl. 211-192.000.
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UNI-BMX, Inc.: *See*—
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Uni-Cardan Aktiengesellschaft: *See*—
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DeMoss, Dean; and Ragle, Herbert U., 4,713,705, Cl. 360-98.000.
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Air Force: *See*—
Allen, John E.; Glover, John D.; and Shepherd, Clayton C., Jr., 4,713,647, Cl. 338-316.000.
Finger, Stephen N., 4,712,979, Cl. 416-96.00R.
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McLevige, William V., 4,712,291, Cl. 437-27.000.
Poirier, J. Leon; and McGahan, Robert V., 4,713,667, Cl. 342-192.000.
Sawyer, Thomas F., 4,712,604, Cl. 164-513.000.
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U.S. Environmental Protection Agency: *See*—
Wilson, John T., Jr.; and Wilson, Barbara H., 4,713,343, Cl. 435-264.000.
U.S. Philips Corporation: *See*—
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Knapp, Alan G.; Overall, Colin D.; and Slater, Richard A. M., 4,713,575, Cl. 313-400.000.
Marshall, Christopher B.; and French, Richard C., 4,713,563, Cl. 307-490.000.
Nicia, Antonius J. A., 4,712,856, Cl. 350-96.120.
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Vangen, Knut. Enclosure constructions for fish breeding. 4,712,509, Cl. 119-3.000.
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Van Sickle, Dale E., to Eastman Kodak Company. Preparation of dimethyl 4,4'-stilbenedicarboxylate and intermediates therefor. 4,713,472, Cl. 560-53.000.

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Varian, Karl R.: *See*—
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Linkow, Leonard I.; and Rinaldi, Anthony W., 4,713,004, Cl. 433-174.000.
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Victor, Paul F., to Boeing Company, The. Wing trailing edge air dam. 4,712,752, Cl. 244-129.100.
Viggiano, Donato A. Artificially vascularized graft. 4,713,055, Cl. 604-93.000.
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Voith, Thomas P. Modular step ramp. 4,712,264, Cl. 14-69.500.
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Voll, Horst; and Meyer, Manfred, to FAG Kugelfischer Georg Schafer (KGaA). Disk storage spindle arrangement. 4,713,704, Cl. 360-97.000.
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von Alpen, Ulrich, to Varta Batterie A.G. Water-free organic electrolyte. 4,713,305, Cl. 429-194.000.
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Vu, Tho T.; and Lee, Kang W., to Honeywell Inc. Multiple input and multiple output or/and circuit. 4,713,559, Cl. 307-446.000.
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Wang, Kenneth Y.; and Yeo, Richard S., to Kimberly-Clark Corporation. Baffle having zoned water vapor permeability. 4,713,069, Cl. 604-378.000.
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Watanabe, Isao; Momonoi, Kaishu; Hiraiwa, Toru; Ono, Satoshi; Nakano, Joji; Nagumo, Katsuyuki; and Takagi, Hiroyasu, to Toyama Chemical Co., Ltd. Vasodilating and platelet aggregation inhibiting 1,4 dihydropyridines with an imidazolyl or pyridyl containing ester. 4,713,387, Cl. 514-332.000.
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Weinberger, Joseph; Bricault, Gary S.; Gruber, David; and Rakover, Eleonora, to Xerox Corporation. Sequencing means for photocopying processes. 4,712,907, Cl. 355-7.000.
Weir, Joseph W., III. Universal fittings. 4,712,812, Cl. 285-177.000.
Weirich, Walter; Barnert, Heiko; Oertel, Michael; and Schulten, Rudolf, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Process and apparatus for conversion of water vapor with coal or hydrocarbon into a product gas. 4,713,234, Cl. 423-648.00R.
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Wenham, Bruce T.; Cook, Raymond; and Hunter, Clifford R., to Astarni Pty. Ltd. Structures for enclosed transfer of persons. 4,712,339, Cl. 52-173.0PS.
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Flick, Robert H.; Dennis, Lawrence D.; and Walker, Roger E., 4,713,635, Cl. 335-8.000.
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Maier, Alfred E., 4,713,504, Cl. 200-146.00R.
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Schauder, Colin D., 4,713,745, Cl. 363-161.000.
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Whatley, Roger A., to Motorola, Inc. Circuit for improving power supply rejection in an operational amplifier with frequency compensation. 4,713,625, Cl. 330-149.000.

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White, Lee Roy. Flexible forms. 4,712,764, Cl. 249-6.000.

Whitley, Warwick M., II, to Attwood Corporation. Boat vent. 4,712,501, Cl. 114-211.000.

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Whitten, Kathleen R.: *See*—
Cohen, Marlene L.; Fuller, Ray W.; Garbrecht, William L.; and Whitten, Kathleen R., 4,713,384, Cl. 514-288.000.

Wichman, William J.; and Troup, Edward M., deceased (by Troup, Cathryn H., executor), to Discovery Toys, Inc. Marble race game. 4,713,038, Cl. 446-168.000.

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Wier, Jan H. Connector and a method of connecting pipes. 4,712,811, Cl. 285-113.000.

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Wild, Wolfgang; Straub, Joachim; and Landgraf, Gunter, to W. C. Heraeus GmbH. Microwave stable tableware. 4,713,512, Cl. 219-10.55E.

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Wilfley, Brian P.: *See*—
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Wilkins, Tracy D.; and Lyerly, David M., to Research Corporation. Vaccines based on insoluble supports. 4,713,240, Cl. 424-92.000.

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Williams, Glen P.: *See*—
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Williams, Reade; and Scott, Paul F., to Emhart Industries, Inc. Molded code mark reader with elongated read beam. 4,713,536, Cl. 250-223.00B.

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Wilson, Harold L. Magnetic safety funnel. 4,712,595, Cl. 141-201.000.

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Winter, Howard J. Book rest with page retainer. 4,712,760, Cl. 248-451.000.

Winter, Rodger C.: *See*—
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Wirz, Armin: *See*—
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Witzel, John R.; and Weisgerber, Paul J., to Cincinnati Milacron Inc. Method and apparatus for aligning cutting tools. 4,712,953, Cl. 409-131.000.

Witzel, Karlheinz, to Sueddeutsche Kuehlerfabrik Julius Fr. Behr GmbH & Co. KG. Heating or air-conditioning ventilation unit for motor vehicles. 4,712,611, Cl. 165-122.000.

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Woidt, Jurgen; and Fries, Wolfgang, to Varta Batterie A.G. Process for manufacturing negative cadmium electrodes for sealed alkaline battery cells. 4,713,126, Cl. 148-6.14R.

Woike, Theo; Krasser, Wolfgang; and Haussuhl, Siegfried, to Kernforschungsanlage Julich GmbH. Optical switch, especially for information storage and retrieval. 4,713,795, Cl. 365-119.000.

Wojciechowski, Charles R., to General Electric Company. High pressure seal. 4,713,546, Cl. 250-374.000.

Wolcott, Herbert A.; and McHaney, James H., to Atlantic Richfield Company. Well flow line choke. 4,712,579, Cl. 137-375.000.

Wolf, Morris A. Method for making merchandising display members. 4,712,286, Cl. 29-463.000.

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Wolfram, Claude J. Method of manufacturing supports for electrical circuits. 4,712,297, Cl. 29-852.000.

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Wolter, Helmut: *See*—
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Womack, Richard H.; Banerjee, Sanjay K.; Shichijo, Hisashi; and Malhi, Satwinder, to Texas Instruments Incorporated. dRAM cell and method. 4,713,678, Cl. 357-23.600.

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Wong, Raymond, to Wong & Bibaoco. Gyroscopic toy. 4,713,039, Cl. 446-233.000.

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Woo, Edmund P.; and Murray, Daniel J., to Dow Chemical Company, The. Polyaromatic cyanate. 4,713,442, Cl. 528-422.000.
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Stone, Wayne B., Jr., 4,713,253, Cl. 426-433.000.
Wood, Ronald E.: *See*—
Sparling, Kenneth P.; Incardona, Angelo; Kikendall, Garth D.; Richardson, David G.; Wood, Ronald E.; and Bakow, Leon, 4,712,958, Cl. 411-506.000.
Wood, Ruey E., Jr., to TRW Inc. Joint assembly. 4,712,940, Cl. 403-133.000.
Woodhall, Edward W. Apparatus for supporting a vehicle for sideways movement. 4,712,483, Cl. 104-48.000.
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Worley, William S., Jr.; Bryg, William R.; and Baum, Allen, to Hewlett-Packard Company. Cache memory consistency control with explicit software instructions. 4,713,755, Cl. 364-200.000.
Worthen, Billie C. Vehicle ice scraper having deformable blade. 4,712,269, Cl. 15-236.00R.
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Stemmle, Denis J., 4,712,785, Cl. 271-187.000.
Temes, Gabor C.; and Wang, Fong J., 4,713,650, Cl. 340-347.0DA.
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Yamada, Kazutoshi; and Yamaguchi, Takao, to Omron Tateisi Electronics Co. Transaction processing system for separate registration and settlement functions. 4,713,760, Cl. 364-405.000.
Yamada, Kazuyoshi, to NEC Corporation. Transistor circuit with controlled collector saturation voltage. 4,713,561, Cl. 307-456.000.
Yamada, Manabu; Yoshida, Ichirou; Yamaguchi, Shunzo; and Atsumi, Morihiro, to Nippondenso Co., Ltd. Spark plug. 4,713,582, Cl. 315-58.000.
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Yamada, Tutomu, to Mitsubishi Denki Kabushiki Kaisha. Excitation control apparatus for rotary electric machine. 4,713,741, Cl. 363-50.000.
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Yamada, Manabu; Yoshida, Ichirou; Yamaguchi, Shunzo; and Atsumi, Morihiro, 4,713,582, Cl. 315-58.000.
Yoshida, Jun: *See*—
Sasaki, Makoto; Yoshida, Jun; Shimizu, Yoshishige; Akazawa, Kiyoshi; Kishita, Eiji; and Hirata, Kaoru, 4,713,291, Cl. 428-373.000.
Yoshida Kogyo, K. K.: *See*—
Kaminaga, Hiromitsu, 4,712,345, Cl. 52-235.000.
Yoshieda, Keiichi, 4,712,718, Cl. 227-62.000.
Yoshida, Masaaki; Endo, Shigeki; Kisanuki, Shigeru; and Kakuzen, Hideo, to Sumitomo Electric Industries, Ltd. Apparatus for producing porous preforms for optical fibers. 4,713,107, Cl. 65-157.000.
Yoshida, Toshio: *See*—
Sunano, Naomasa; Asahi, Naotatsu; and Yoshida, Toshio, 4,713,646, Cl. 338-34.000.
Yoshida, Toshiyuki; and Arai, Mitsuru, to Kabushiki Kaisha Komatsu Seisakusho. Control apparatus for hydraulic motor. 4,712,377, Cl. 60-444.000.
Yoshieda, Keiichi, to Yoshida Kogyo, K. K. Apparatus for assembling pairs of fastener elements. 4,712,718, Cl. 227-62.000.
Yoshikawa, Hideki: *See*—
Yasuda, Isao; Yoshisato, Yorinobu; Yoshikawa, Hideki; and Taketa, Kazuhiko, 4,713,709, Cl. 360-121.000.
Yoshikawa, Shozi, to Olympus Optical Co., Ltd. Semiconductor laser driver. 4,713,819, Cl. 372-9.000.
Yoshiki, Naokazu; Saito, Yutaka; and Haba, Tsuneo, to Mitsubishi Kinzoku Kabushiki Kaisha. Apparatus for working surface of metal pipe. 4,712,407, Cl. 72-68.000.
Yoshinaga, Kazuo: *See*—
Kanbe, Junichiro; and Yoshinaga, Kazuo, 4,712,872, Cl. 350-333.000.
Yoshisato, Yorinobu: *See*—
Yasuda, Isao; Yoshisato, Yorinobu; Yoshikawa, Hideki; and Taketa, Kazuhiko, 4,713,709, Cl. 360-121.000.
Yoshitomi Pharmaceutical Industries, Ltd.: *See*—
Akashi, Hiroyuki; Inoue, Takeshi; and Horie, Shoichi, 4,713,474, Cl. 560-66.000.
Ao, Hideki; Obata, Minoru; Yamanaka, Tsutomu; and Mikashima, Hiroshi, 4,713,381, Cl. 514-222.000.
Yoshizawa, Shuji; Mitani, Wataru; Yamamoto, Mariko; Sanjoh, Akira; and Ikezue, Tatsuya, to Kabushiki Kaisha Toshiba. Electrophotographic photosensitive member using microcrystalline silicon. 4,713,308, Cl. 430-65.000.
Young, Jeffrey H. Fuel injector testing device. 4,712,421, Cl. 73-119.00A.
Young, William L., to Hy-Con Products, Inc. Container for static-sensitive articles. 4,712,674, Cl. 206-328.000.
Yuan, Lo J., to Top Driver Enterprise Co., Ltd. Electric torsion-controlled screwdriver with an improved automatic turn-off device. 4,712,456, Cl. 81-473.000.
Yui, Yoshikiyo, to Canon Kabushiki Kaisha. Exposure apparatus. 4,713,675, Cl. 355-69.000.
Zahm, Donald E.; and Strickler, Gary R., to Dow Chemical Company, The. Power proportioning controller for solid state relays. 4,713,601, Cl. 323-322.000.
Zaid, Najib H. Dispersed oil soluble corrosion inhibitor and water soluble phosphonate scale inhibitor composition. 4,713,184, Cl. 252-8.552.
Zambri, Patrick M.: *See*—
Marsh, Gary B.; Fanelli, Anthony J.; Armor, John N.; and Zambri, Patrick M., 4,713,233, Cl. 423-608.000.
Zamzow, Donald D.; and Gorski, George L. Programmed mix and delivery system. 4,712,511, Cl. 119-51.00R.
Zarini, Franco: *See*—
Perrone, Ettore; Alpegiani, Marco; Zarini, Franco; Bruna, Costantino D.; and Franceschi, Giovanni, 4,713,378, Cl. 514-192.000.
Zarley, Donald H.: *See*—
Zarley, Marilyn J.; and Zarley, Donald H., 4,712,504, Cl. 116-222.000.
Zarley, Marilyn J.; and Zarley, Donald H. Tennis scoring means. 4,712,504, Cl. 116-222.000.
Zbar, Jack: *See*—
Khudenko, Boris M.; and Zbar, Jack, 4,713,102, Cl. 62-535.000.
Zell, Karl: *See*—
Seidel, Peter; Pelzl, Leo; and Zell, Karl, 4,712,849, Cl. 439-607.000.
Zemanek, Danny: *See*—
Kester, Eugene A.; Reeves, Scott P.; and Zemanek, Danny, 4,712,756, Cl. 248-165.000.
Zenith Electronics Corporation: *See*—
Lee, Sae D.; and Palac, Kazimir, 4,713,034, Cl. 445-45.000.
Zhidkova, Irina S.: *See*—
Arutjunian, Norair S.; Kornena, Elena P.; Kazarian, Robert V.; Ponomareva, Natalya A.; Redko, Grigory V.; Sakhno, Lidia T.; and Zhidkova, Irina S., 4,713,155, Cl. 204-155.000.
Zievers, James F.; and Eggerstedt, Paul, to Industrial Filter & Pump Mfg. Co. Mounting arrangement for a tube-type filter element. 4,713,174, Cl. 210-233.000.
Zimmerman, Norman B.: *See*—
Riccitiello, Salvatore R.; Smith, Marnell; Goldstein, Howard E.; and Zimmerman, Norman B., 4,713,275, Cl. 428-76.000.
Ziogas, Phoivos D.: *See*—
Huynh, Anh N.; and Ziogas, Phoivos D., 4,713,220, Cl. 422-186.160.
Zulauf, Karlheinz; and Breuer, Lothar, to Wella Aktiengesellschaft. Apparatus for the metered removal of pasty or fluid substances. 4,712,593, Cl. 141-113.000.
Zurilla, Ronald W.; and Huff, John, to Parker Chemical Company. Alkaline resistant phosphate conversion coatings. 4,713,121, Cl. 428-472.300.
Zweifel, Hans: *See*—
Riediker, Martin; Meier, Kurt; and Zweifel, Hans, 4,713,401, Cl. 522-65.000.
Zwirn, Robert, to Hughes Aircraft Company. Noninvasive DC restoration to upgrade AC coupled systems. 4,713,694, Cl. 358-171.000.
Zwolinski, Leon M.; and Dwyer, Frank J., to Allied Corporation. Foaming system for phenolic foams. 4,713,400, Cl. 521-131.000.
501 Aeroflex Laboratories, Incorporated: *See*—
Schwartz, Myron, 4,713,569, Cl. 310-152.000.

# LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 15TH DAY OF DECEMBER, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

AMP Incorporated: *See*—
Fedder, James L.; and Taylor, Attalee S., Re. 32,559, Cl. 439-325.000.

Chan, Kwok Y., to Eastman Kodak Company. Autorewinding self-threading camera. Re. 32,558, Cl. 354-173.100.

Conradty GmbH & Co. Metallelektroden KG: *See*—
Koziol, Konrad; and Wenk, Erich, Re. 32,561, Cl. 204-288.000.

Eastman Kodak Company: *See*—
Chan, Kwok Y., Re. 32,558, Cl. 354-173.100.

Fedder, James L.; and Taylor, Attalee S., to AMP Incorporated. Card edge connector locking device. Re. 32,559, Cl. 439-325.000.

Givens, James A. Stabilized survival raft. Re. 32,560, Cl. 441-37.000.

Koziol, Konrad; and Wenk, Erich, to Conradty GmbH & Co. Metallelektroden KG. Coated metal anode for the electrolytic recovery of metals. Re. 32,561, Cl. 204-288.000.

Litz, Lawrence M., to Union Carbide Corporation. Process and apparatus for mixing a gas and a liquid. Re. 32,562, Cl. 261-91.000.

Schlumberger Technology Corporation: *See*—
Scholberg, Andre, Re. 32,564, Cl. 324-373.000.

Scholberg, Andre, to Schlumberger Technology Corporation. Apparatus for determining the resistivity of a subsurface earth formation at different lateral distances from a bore hole wall. Re. 32,564, Cl. 324-373.000.

Stolar, Inc.: *See*—
Stolarczyk, Larry G., Re. 32,563, Cl. 324-334.000.

Stolarczyk, Larry G., to Stolar, Inc. Continuous wave medium frequency signal transmission survey procedure for imaging structure in coal seams. Re. 32,563, Cl. 324-334.000.

Taylor, Attalee S.: *See*—
Fedder, James L.; and Taylor, Attalee S., Re. 32,559, Cl. 439-325.000.

Union Carbide Corporation: *See*—
Litz, Lawrence M., Re. 32,562, Cl. 261-91.000.

Wenk, Erich: *See*—
Koziol, Konrad; and Wenk, Erich, Re. 32,561, Cl. 204-288.000.

# LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

American Safety Equipment Corp.: *See*—
Hollowell, William, B1 4,562,977, Cl. 242-107.40D.

Clatworthy, Edward F.: *See*—
Smith, Darrell F., Jr.; and Clatworthy, Edward F., B1 4,445,944, Cl. 148-12.300.

Hardee, Kim C., to Immos Corporation. Method of making single poly memory cell. B1 4,486,944, 12-15-87, Cl. 437-52.000.

Hollowell, William, to American Safety Equipment Corp. Easily assembled seat belt retractor and method. B1 4,562,977, 12-15-87, Cl. 242-107.40D.

Huntington Alloys, Inc.: *See*—
Smith, Darrell F., Jr.; and Clatworthy, Edward F., B1 4,445,944, Cl. 148-12.300.

Immos Corporation: *See*—
Hardee, Kim C., B1 4,486,944, Cl. 437-52.000.

Norwich, Daniel, to Telecredit Inc. Telephone scheduling system. B1 3,989,899, 12-15-87, Cl. 379-134.000.

Smith, Darrell F., Jr.; and Clatworthy, Edward F., to Huntington Alloys, Inc. Heat treatments of low expansion alloys. B1 4,445,944, 12-15-87, Cl. 148-12.300.

Telecredit Inc.: *See*—
Norwich, Daniel, B1 3,989,899, Cl. 379-134.000.

# LIST OF DESIGN PATENTEES

Aaron, Willard. Bath caddy. 293,183, 12-15-87, Cl. D6-525.000.

Abrams, Robert C.: *See*—
Weder, Donald E.; Abrams, Robert C.; and Weder, Erwin H., 293,222, Cl. D11-164.000.
Weder, Donald E.; Weder, Erwin H.; and Abrams, Robert C., 293,223, Cl. D11-164.000.

American Locker Group Incorporated: *See*—
Chester, Richard J., 293,173, Cl. D6-432.000.

Andre Morin Designers Inc.: *See*—
Morin, Andre , 293,185, Cl. D6-553.000.

Appel, Mel; and Kress, George, to Mel Appel Company, The. Activity desk. 293,254, 12-15-87, Cl. D21-59.000.

Asea AB: *See*—
Kaufmann, Herbert; and Back, Ulf, 293,250, Cl. D15-199.000.

Back, Ulf: *See*—
Kaufmann, Herbert; and Back, Ulf, 293,250, Cl. D15-199.000.

Baggioli, Giuseppe. Combined cook pot and container for food. 293,192, 12-15-87, Cl. D7-354.000.

Balisteri, Jonathan W. English pub electronic bar. 293,179, 12-15-87, Cl. D6-474.000.

Barish, Sidney, to Dickie Dee Ice Cream (Canada) Ltd. Confection on a stick. 293,155, 12-15-87, Cl. D1-104.000.

Barone, Charles A. Cork puller. 293,200, 12-15-87, Cl. D8-42.000.

BBC International Ltd.: *See*—
Campbell, Robert R., 293,158, Cl. D2-309.000.

Beaty, David L.; and Loughrige, William W. Illumination attachment clip for firearms. 293,206, 12-15-87, Cl. D8-395.000.

Bel-Art Products, Inc.: *See*—
Milden, Morton, 293,249, Cl. D15-9.000.

Berg, Roger M. Bicycle wheel cover. 293,233, 12-15-87, Cl. D12-204.000.

BIO-Support Industries Ltd.: *See*—
Roberts, Frank L., 293,170, Cl. D6-368.000.

Black & Decker, Inc.: *See*—
House, Lawrence E., II; and Somers, Robert I., 293,201, Cl. D8-68.000.

Bluestein, Bernard B.: *See*—
Stephen, James C.; Lohmeyer, Charles W.; and Bluestein, Bernard B., 293,191, Cl. D7-332.000.

Boyle-Midway Household Products, Inc.: *See*—
Ronayne, Walter M., 293,263, Cl. D23-208.000.

Braun Aktiengesellschaft: *See*—
Ullman, Roland, 293,265, Cl. D28-49.000.

Bridgford Foods Corporation: *See*—
Vandervoort, David L., 293,193, Cl. D7-357.000.

Brown, Michael, to Northern Telecom Limited. Telephone set. 293,237, 12-15-87, Cl. D14-53.000.

Bruno, Robert H.; Burger, Laurie J.; Kipperman, Stuart; Mayer, Geoffrey R.; Protzmann, Donald E.; and Uhl, Robert F., to Sherwood Medical Co. Electronic thermometer. 293,215, 12-15-87, Cl. D10-57.000.

Burger, Laurie J.: *See*—
Bruno, Robert H.; Burger, Laurie J.; Kipperman, Stuart; Mayer, Geoffrey R.; Protzmann, Donald E.; and Uhl, Robert F., 293,215, Cl. D10-57.000.

Cahusak, Piet C., to Intradal Nederland BV. Bottle. 293,209, 12-15-87, Cl. D9-375.000.

Campbell, Robert R., to BBC International Ltd. Sport shoe. 293,158, 12-15-87, Cl. D2-309.000.

Cari-All Inc.: *See*—
Trubiano, Antoine, 293,204, Cl. D8-380.000.

Carmichael, Bruce. Carrier attachment for an automobile seat or the like. 293,162, 12-15-87, Cl. D3-40.000.

Carter, Clyde L. Tissue box holder. 293,182, 12-15-87, Cl. D6-518.000.

Caswell, William G. Wire wheel brush. 293,166, 12-15-87, Cl. D4-137.000.

Chap, John P., to Selfix, Inc. Towel holder. 293,184, 12-15-87, Cl. D6-546.000.

Chester, Richard J., to American Locker Group Incorporated. Console for controlling access to multiple compartment cabinets. 293,173, 12-15-87, Cl. D6-432.000.

Chu, Robin; and Toor, John W., to Xerox Corporation. Keyboard or similar article. 293,244, 12-15-87, Cl. D14-100.000.

Citicorp Credit Services, Inc.: *See*—
Wan, Anthony W.; and Kopp, Larry S., 293,241, Cl. D14-100.000.

Connelly, Patrick J.; and Hoyt, Denis J., to Connelly Skis, Inc. Water ski. 293,259, 12-15-87, Cl. D21-229.000.

Connelly, Patrick J.; and Hoyt, Denis J., to Connelly Skis, Inc. Water ski. 293,260, 12-15-87, Cl. D21-229.000.

Connelly Skis, Inc.: *See*—
Connelly, Patrick J.; and Hoyt, Denis J., 293,259, Cl. D21-229.000.
Connelly, Patrick J.; and Hoyt, Denis J., 293,260, Cl. D21-229.000.

Conrad, George R., to Continental Plastic Containers, Inc. Bottle or the like. 293,210, 12-15-87, Cl. D9-405.000.

Continental Plastic Containers, Inc.: *See*—
Conrad, George R., 293,210, Cl. D9-405.000.

Cosatto SpA: *See*—
Zuliani, Alessandro, 293,212, Cl. D9-418.000.

Crapser, James R., to S. C. Johnson & Son, Inc. Actuator cap. 293,213, 12-15-87, Cl. D9-448.000.

Crapser, James R., to S. C. Johnson & Son, Inc. Valve actuator cap. 293,214, 12-15-87, Cl. D9-448.000.

Daewoo Electronics Co., Ltd.: *See*—
Kim, Young S., 293,195, Cl. D7-384.000.

Danner Shoe Manufacturing Co.: *See*—
Sacre, Guillaume, 293,139, Cl. D2-313.000.

Demick, Robert L.: *See*—
Mastro, Louis L.; and Demick, Robert L., 293,236, Cl. D14-53.000.

DePaul, Richard E.; and Hutchinson, Jack E., Sr., to Rendoll Paper Company. Ice cream carton. 293,211, 12-15-87, Cl. D9-416.000.

Dewing, Kenneth M. Lid for a refuse container. 293,268, 12-15-87, Cl. D34-11.000.

Dickie Dee Ice Cream (Canada) Ltd.: *See*—
Barish, Sidney, 293,155, Cl. D1-104.000.

Drackett Company, The: *See*—
Machacek, Robert W., 293,165, Cl. D4-135.000.

Dunnagan, Elena M. Bathing suit or the like. 293,156, 12-15-87, Cl. D2-41.000.

Elie, Francois, to Horlogerie Photographique Francais. Handset telephone. 293,238, 12-15-87, Cl. D14-64.000.

Fernandez, James. Goose caller. 293,216, 12-15-87, Cl. D10-119.000.

Flanagan, Frederick P., Sr. Combined plate and cup tray. 293,190, 12-15-87, Cl. D7-71.000.

Fujitsu Limited: *See*—
Kakiuchi, Yoshinori, 293,243, Cl. D14-114.000.

Germain, Robert A.; and Portz, William E., to USM Corporation. Head assembly for a rake. 293,196, 12-15-87, Cl. D8-13.000.

Grenley, J. David. Hand-held can opener. 293,199, 12-15-87, Cl. D8-18.000.

Hamami, Demir. Buffet. 293,177, 12-15-87, Cl. D6-446.000.

Hamami, Demir. Cabinet. 293,178, 12-15-87, Cl. D6-448.000.

Hamami, Demir. Table. 293,180, 12-15-87, Cl. D6-480.000.

Hasegawa, Akira, to Yoshida Kogyo K. K. Slide fastener chain. 293,225, 12-15-87, Cl. D11-221.000.

Hashimoto, Masanori, to Ricoh Company, Ltd. Facsimile transceiver/-receiver. 293,240, 12-15-87, Cl. D14-94.000.

Helou, Garry; and Whitley, Kevin, to Repco Limited. Battery. 293,234, 12-15-87, Cl. D13-8.000.

Hertensteiner, Thomas J. Stud mount, pipe support bracket. 293,203, 12-15-87, Cl. D8-354.000.

Highland Supply Corporation: *See*—
Weder, Donald E.; Abrams, Robert C.; and Weder, Erwin H., 293,222, Cl. D11-164.000.
Weder, Donald E.; Weder, Erwin H.; and Abrams, Robert C., 293,223, Cl. D11-164.000.
Weder, Donald E.; and Weder, Erwin H., 293,224, Cl. D11-164.000.

Hitachi, Ltd.: *See*—
Hujimori, Shirou; and Miyazaki, Masayoshi, 293,242, Cl. D14-100.000.
Hujimori, Shirou; and Katou, Kouichi, 293,245, Cl. D14-100.000.

Horlogerie Photographique Francais: *See*—
Elie, Francois, 293,238, Cl. D14-64.000.

House, Lawrence E., II; and Somers, Robert I., to Black & Decker, Inc. Combined cordless electric drill, holster and charging base therefor. 293,201, 12-15-87, Cl. D8-68.000.

Hoyt, Denis J.: *See*—
Connelly, Patrick J.; and Hoyt, Denis J., 293,259, Cl. D21-229.000.
Connelly, Patrick J.; and Hoyt, Denis J., 293,260, Cl. D21-229.000.

Hujimori, Shirou; and Miyazaki, Masayoshi, to Hitachi, Ltd. Controller for a point-of-sales system. 293,242, 12-15-87, Cl. D14-100.000.

Hujimori, Shirou; and Katou, Kouichi, to Hitachi, Ltd. Printer for a point-of-sales system. 293,245, 12-15-87, Cl. D14-100.000.

Hutchinson, Jack E., Sr.: *See*—
DePaul, Richard E.; and Hutchinson, Jack E., Sr., 293,211, Cl. D9-416.000.

Ikuma, Masami, to Toyota Jidosha Kabushiki Kaisha. Rear bumper for an automobile. 293,232, 12-15-87, Cl. D12-169.000.

Insetta, Diane. Centaur figure. 293,218, 12-15-87, Cl. D11-159.000.

Interdica S.A.: *See*—
Kanoui, Joseph, 293,251, Cl. D16-102.000.

Interlego A.G.: *See*—
Tapdrup, Erik P., 293,255, Cl. D21-119.000.

Intradal Nederland BV: *See*—
Cahusak, Piet C., 293,209, Cl. D9-375.000.

Kakiuchi, Yoshinori, to Fujitsu Limited. Keyboard. 293,243, 12-15-87, Cl. D14-114.000.

Kanoui, Joseph, to Interdica S.A. Spectacles. 293,251, 12-15-87, Cl. D16-102.000.

Katou, Kouichi: *See*—
Hujimori, Shirou; and Katou, Kouichi, 293,245, Cl. D14-100.000.

Kaufmann, Herbert; and Back, Ulf, to Asea AB. Industrial robot. 293,250, 12-15-87, Cl. D15-199.000.

Kawaoka, Norihiko, to Mazda Motor Corporation. Automobile radiator grill. 293,230, 12-15-87, Cl. D12-163.000.

Kim, Young S., to Daewoo Electronics Co., Ltd. Food processor. 293,195, 12-15-87, Cl. D7-384.000.

Kipperman, Stuart: *See*—
Bruno, Robert H.; Burger, Laurie J.; Kipperman, Stuart; Mayer, Geoffrey R.; Protzmann, Donald E.; and Uhl, Robert F., 293,215, Cl. D10-57.000.

Kitagawa Industries Co., Ltd.: *See*—
Nakano, Yoshihito, 293,205, Cl. D8-395.000.
Nakano, Yoshihito, 293,207, Cl. D8-396.000.

Kopp, Larry S.: *See*—
Wan, Anthony W.; and Kopp, Larry S., 293,241, Cl. D14-100.000.

Kress, George: *See*—
Appel, Mel; and Kress, George, 293,254, Cl. D21-59.000.

Kreth, Julius, to Mike & Kremmel, Ltd. Food slicer. 293,194, 12-15-87, Cl. D7-381.000.

Larson, Kenneth W.; and Nagele, Albert L., to Motorola, Inc. Radio control unit or similar article. 293,239, 12-15-87, Cl. D14-68.000.

Le Droit, Loren L. Ice creeper. 293,160, 12-15-87, Cl. D2-317.000.

Lohmeyer, Charles W.: *See*—
Stephen, James C.; Lohmeyer, Charles W.; and Bluestein, Bernard B., 293,191, Cl. D7-332.000.

Loof, Torbjorn H., to Partex Fabriksaktiebolag. Holder for electrical cable markers. 293,235, 12-15-87, Cl. D13-13.000.

Loughrige, William W.: *See*—
Beaty, David L.; and Loughrige, William W., 293,206, Cl. D8-395.000.

Lubke, Karl W. Chair. 293,171, 12-15-87, Cl. D6-370.000.

Machacek, Robert W., to Drackett Company, The. Angled broom. 293,165, 12-15-87, Cl. D4-135.000.

Massey, Clifton. Trash bag container. 293,267, 12-15-87, Cl. D34-7.000.

Mastro, Louis L.; and Demick, Robert L., to Square D Company. Combination telephone handset and keyboard console base. 293,236, 12-15-87, Cl. D14-53.000.

Matsumoto, Nobuki, to Ricoh Company, Ltd. Printer. 293,248, 12-15-87, Cl. D14-111.000.

Mattson, Jeanette, to Syracuse China Corporation. Decalcomania or the like for china dinnerware. 293,187, 12-15-87, Cl. D7-39.000.

Mayer, Geoffrey R.: *See*—
Bruno, Robert H.; Burger, Laurie J.; Kipperman, Stuart; Mayer, Geoffrey R.; Protzmann, Donald E.; and Uhl, Robert F., 293,215, Cl. D10-57.000.

Mazda Motor Corporation: *See*—
Kawaoka, Norihiko, 293,230, Cl. D12-163.000.

McElhaney, Craig J., to Quaker Oats Company, The. Doll stroller. 293,227, 12-15-87, Cl. D12-129.000.

Mel Appel Company, The: *See*—
Appel, Mel; and Kress, George, 293,254, Cl. D21-59.000.

Mike & Kremmel, Ltd.: *See*—
Kreth, Julius, 293,194, Cl. D7-381.000.

Milden, Morton, to Bel-Art Products, Inc. Carbon dioxide compressing generator for dry ice manufacture. 293,249, 12-15-87, Cl. D15-9.000.

Miller, Ian J. Handle for sport racket or similar article. 293,257, 12-15-87, Cl. D21-230.000.

Miller, Melvin M. Display stand. 293,174, 12-15-87, Cl. D6-436.000.

Miller, Melvin M. Display stand. 293,175, 12-15-87, Cl. D6-436.000.

Miller, Melvin M. Display stand. 293,176, 12-15-87, Cl. D6-436.000.

Miyazaki, Masayoshi: *See*—
Hujimori, Shirou; and Miyazaki, Masayoshi, 293,242, Cl. D14-100.000.

Moore, Loyd C., to Output Technology Corporation. Electronic printer. 293,246, 12-15-87, Cl. D14-111.000.

Morin, Andre , to Andre Morin Designers Inc. Wall mounted support. 293,185, 12-15-87, Cl. D6-553.000.

Motorola, Inc.: *See*—
Larson, Kenneth W.; and Nagele, Albert L., 293,239, Cl. D14-68.000.

Nagele, Albert L.: *See—*
Larson, Kenneth W.; and Nagele, Albert L., 293,239, Cl. D14-68.000.
Nakade, Kenichi, to Ricoh Company, Ltd. Laser printer. 293,247, 12-15-87, Cl. D14-111.000.
Nakano, Yoshihito, to Kitagawa Industries Co., Ltd. Mini electric wire clamp. 293,205, 12-15-87, Cl. D8-395.000.
Nakano, Yoshihito, to Kitagawa Industries Co., Ltd. Electric wire clamp. 293,207, 12-15-87, Cl. D8-396.000.
Northern Telecom Limited: *See—*
Brown, Michael, 293,237, Cl. D14-53.000.
Noshiro, Mitsunori, to Tomy Kogyo Co., Inc. Toy vehicle. 293,258, 12-15-87, Cl. D21-136.000.
O'Donovan, Thomas. Ear ornament. 293,217, 12-15-87, Cl. D11-78.000.
Output Technology Corporation: *See—*
Moore, Loyd C., 293,246, Cl. D14-111.000.
Parnham, Leon. Back support pillow. 293,186, 12-15-87, Cl. D6-601.000.
Partex Fabriksaktiebolag: *See—*
Loof, Torbjorn H., 293,235, Cl. D13-13.000.
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USM Corporation: *See—*
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van der Heijden, Johannes, to S. C. Johnson & Son, Inc. Dispensing bottle. 293,208, 12-15-87, Cl. D9-367.000.
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Zuliani, Alessandro, to Cosatto SpA. Combined packaging and display container. 293,212, 12-15-87, Cl. D9-418.000.

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van der Jagt, Martinus, 6,062, Cl. 74.000.
Duffett, William E., to Yoder Brothers, Inc. Carnation plant named Ace High. 6,061, 12-15-87, Cl. 70.000.
van der Jagt, Martinus, to Chrysanthemum Breeders Association, N.V. Chrysanthemum named 'Red Refla'. 6,060, 12-15-87, Cl. 74.000.
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Yode. Brothers, Inc.: *See*—
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# CLASSIFICATION OF PATENTS

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**CLASS 192**

0.033 4,712,658
13 R 4,712,659
18 B 4,712,660
45 4,712,661
53 F 4,712,662
58 A 4,712,663

**CLASS 193**

17 4,712,664

**CLASS 198**

346.2 4,712,665
303 4,712,666
643 4,712,667
698 4,712,668
771 4,712,669
803.01 4,712,670

**CLASS 200**

5 R 4,713,498
16 D 4,713,499
48 KB 4,713,500
50 AA 4,713,501
61.82 4,713,502
144 B 4,713,503
146 R 4,713,504
153 SC 4,713,505
4,713,508
158 4,713,506
159 A 4,713,507
328 4,713,509

**CLASS 202**

248 4,713,148

**CLASS 204**

23 4,713,149
38.3 4,713,150
58.5 4,713,151
130 4,713,152
144.5 4,713,153
145 R 4,713,154
155 4,713,155
182.4 4,713,156
192.11 4,713,157
196 4,713,158
197 4,713,159
231 4,713,160
243 M 4,713,161
254 4,713,162
288 Re.32,561
296 4,713,163
400 4,713,164
403 4,713,165
425 4,713,166

**CLASS 206**

44 R 4,712,671
83.5 4,712,672
232 4,712,673
328 4,712,674
332 4,712,675
338 4,712,676
345 4,712,677
387 4,712,678
4,712,679
427 4,712,680
438 4,712,681
478 4,712,683
554 4,712,684
591 4,712,685
597 4,712,686
600 4,712,687
602 4,712,688
626 4,712,689
628 4,712,690
631.3 4,712,727

**CLASS 208**

59 4,713,167
131 4,713,168
157 4,713,169

**CLASS 209**

455 4,712,682

**CLASS 210**

85 4,713,170
110 4,713,171
150 4,713,172
169 4,713,173
233 4,713,174
259 4,713,175
645 4,713,176
697 4,713,177
734 4,713,178
747 4,713,179
773 4,713,180
776 4,713,181

**CLASS 211**

49.1 4,712,691
119 4,712,692
164 4,712,693
184 4,712,694
191 4,712,695
192 4,712,696

**CLASS 212**

189 4,712,697

**CLASS 215**

100 A 4,712,698
329 4,712,699
366 4,712,700

**CLASS 219**

10.55 B 4,713,514
10.55 D 4,713,511
10.55 E 4,713,510
4,713,512
10.55 F 4,713,513
69 E 4,713,515
69 P 4,713,516
69 W 4,713,517
121 LC 4,713,519
4,713,520
121 LM 4,713,518
130.5 4,713,521
202 4,713,522
307 4,713,524
308 4,713,525
332 4,713,526
385 4,713,523
464 4,713,527
492 4,713,528
541 4,713,529
543 4,713,530
545 4,713,531

**CLASS 220**

71 4,712,701
90.2 4,712,702
210 4,712,703
254 4,712,704
270 4,712,705
276 4,712,706
307 4,712,707
319 4,712,708
334 4,712,709
414 4,712,710
457 4,712,711

**CLASS 221**

68 4,712,712

**CLASS 222**

3 4,712,713
91 4,712,714
145 4,712,715
189 4,712,716
252 4,712,717

**CLASS 227**

62 4,712,718

**CLASS 228**

37 4,712,719
49.3 4,712,720
56.3 4,712,721
104 4,712,722
111 4,712,723
112 4,712,724

**CLASS 229**

8 4,712,725
4,712,726
52 B 4,712,728
72 4,712,729
169 4,712,730

**CLASS 232**

17 4,712,731
35 4,712,732

**CLASS 235**

467 4,713,532

**CLASS 236**

10 4,712,733

**CLASS 237**

70 4,712,734

**CLASS 238**

94 4,712,735

**CLASS 239**

11 4,712,736
58 4,712,737
74 4,712,738
290 4,712,739
340 4,712,740

**CLASS 241**

16 4,712,741
20 4,712,742
30 4,712,743
80 4,712,744
261.3 4,712,745

**CLASS 242**

43 R 4,712,746
107.4 D B1 4,562,977

**CLASS 244**

3.22 4,712,747
4,712,748
22 4,712,749
117 A 4,712,750
119 4,712,751
129.1 4,712,752
161 4,712,753

**CLASS 248**

1 4,712,754
49 4,712,755
165 4,712,756
188 4,712,757
188.7 4,712,758
429 4,712,759
451 4,712,760
475.1 4,712,761
533 4,712,762
553 4,712,763

**CLASS 249**

6 4,712,764
91 4,712,765

**CLASS 250**

203 R 4,713,533
214 B 4,713,534
221 4,713,535
223 B 4,713,536
227 4,713,537
4,713,538
231 R 4,713,540
231 SE 4,713,539
4,713,541
251 4,713,542
310 4,713,543
334 4,713,544
338 4,713,545
373 4,713,547
374 4,713,546
423 R 4,713,548
484.1 4,713,549
560 4,713,550
561 4,713,551
577 4,713,552

**CLASS 251**

90 4,712,766
129.14 4,712,767
305 4,712,768
324 4,712,769

**CLASS 252**

3 4,713,182
8.515 4,713,183
8.552 4,713,184
8.554 4,713,185
30 4,713,186
49 6 4,713,187
51.5 A 4,713,188
4,713,189
4,713,190
4,713,191
62.3 R 4,713,192
91 4,713,193
174.23 4,713,194
180 4,713,195
299.01 4,713,196
299.61 4,713,197
301.17 4,713,198
633 4,713,199

**CLASS 254**

98 4,712,770
131 4,712,771
264 4,712,772

**CLASS 256**

25 4,712,773

**CLASS 260**

408 4,713,200
501.17 4,713,201

**CLASS 261**

91 Re.32,562

**CLASS 264**

46.5 4,713,202
117 4,713,203
120 4,713,204
176.1 4,713,205
328.2 4,713,206
515 4,713,207

**CLASS 266**

155 4,712,774

**CLASS 267**

64.21 4,712,776
140.1 4,712,777
170 4,712,778
220 4,712,775
256 4,712,780

**CLASS 269**

43 4,712,779
322 4,712,781

**CLASS 271**

21 4,712,782
100 4,712,783
108 4,712,784
187 4,712,785
207 4,712,786
311 4,712,787

**CLASS 272**

69 4,712,788
73 4,712,789
4,712,790
4,712,791
93 4,712,792
118 4,712,793
122 4,712,794

**CLASS 273**

73 R 4,712,795
138 A 4,712,799
148 R 4,712,796
163 R 4,712,797
164 4,712,798

**CLASS 277**

1 4,712,800
71 4,712,801
212 C 4,712,802

**CLASS 279**

123 4,712,831

**CLASS 280**

47.13 B 4,712,803
47.13 R 4,712,804
154.5 R 4,712,805
217 4,712,806
707 4,712,807

**CLASS 281**

15 R 4,712,808

**CLASS 285**

21 4,712,809
93 4,712,810
113 4,712,811
177 4,712,812
250 4,712,813
325 4,712,814
334 4,712,815

**CLASS 292**

253 4,712,816
336.3 4,712,817

**CLASS 294**

19.1 4,712,821
64.1 4,712,818
92 4,712,819
138 4,712,820

**CLASS 296**

24 R 4,712,822
37.8 4,712,823
65 R 4,712,824
76 4,712,825
93 4,712,826
99 R 4,712,827
121 4,712,828
203 4,712,829

**CLASS 297**

42 4,712,830
180 4,712,832
219 4,712,833
284 4,712,834
304 4,712,835
429 4,712,836
442 4,712,837

**CLASS 301**

37 SA 4,712,838

**CLASS 303**

3 4,712,839
24 R 4,712,840
92 4,712,841

**CLASS 307**

64 4,713,553
4,713,554
66 4,713,555
219.1 4,713,556
242 4,713,557
264 4,713,558
446 4,713,559
455 4,713,560
456 4,713,561
462 4,713,562
490 4,713,563
542.1 4,713,564

**CLASS 310**

49 R 4,713,565
58 4,713,566
105 4,713,567
112 4,713,568
152 4,713,569
154 4,713,570
316 4,713,571
323 4,713,572
329 4,713,573

**CLASS 312**

196 4,712,842
242 4,712,843
265 4,712,844
319 4,712,845

**CLASS 313**

130 4,713,574
400 4,713,575
402 4,713,576
468 4,713,577
481 4,713,578
500 4,713,579
624 4,713,580

**CLASS 315**

5.41 4,713,581
58 4,713,582
82 4,713,583
83 4,713,584
111.81 4,713,585
200 A 4,713,586
289 4,713,587
382 4,713,588
400 4,713,589

**CLASS 318**

254 4,713,590
257 4,713,591
565 4,713,592
572 4,713,593
685 4,713,594
759 4,713,595
802 4,713,596

**CLASS 320**

13 4,713,597

**CLASS 323**

245 4,713,598
312 4,713,599
322 4,713,601
351 4,713,600
354 4,713,602

**CLASS 324**

61 P 4,713,603
73 PC 4,713,607
73 R 4,713,605
4,713,606
142 4,713,608
156 4,713,609
157 4,713,610
158 D 4,713,612
158 F 4,713,611
208 4,713,613
307 4,713,614
4,713,615
309 4,713,616
334 Re.32,563
373 Re.32,564
395 4,713,617
438 4,713,618
460 4,713,619
500 4,713,604

**CLASS 328**

55 4,713,621
61 4,713,622
72 4,713,623
150 4,713,620

**CLASS 330**

118 4,713,624
149 4,713,625
253 4,713,626
254 4,713,628
263 4,713,629
306 4,713,627

**CLASS 331**

4 4,713,630
36 C 4,713,631
117 D 4,713,632

**CLASS 333**

222 4,713,633
245 4,713,634

**CLASS 335**

8 4,713,635
35 4,713,636
76 4,713,637
79 4,713,638
172 4,713,639

194 4,713,640
213 4,713,641

**CLASS 336**

92 4,713,642

**CLASS 337**

140 4,713,643
158 4,713,644
246 4,713,645

**CLASS 338**

34 4,713,646
316 4,713,647

**CLASS 340**

52 D 4,713,648
347 DA 4,713,649
4,713,650
407 4,713,651
652 4,713,652
654 4,713,653
671 4,713,654
677 4,713,655
723 4,713,656
748 4,713,657
815.11 4,713,658
825.44 4,713,659
825.69 4,713,660
994 4,713,661

**CLASS 342**

13 4,713,662
70 4,713,663
91 4,713,664
104 4,713,665
152 4,713,666
192 4,713,667
384 4,713,668
455 4,713,669

**CLASS 343**

700 MS 4,713,670

**CLASS 346**

1.1 4,713,746
76 PH 4,713,671
108 4,713,672

**CLASS 350**

3.6 4,712,851
6.5 4,712,853
96.12 4,712,854
4,712,855
4,712,856
96.14 4,712,857
96.15 4,712,858
96.16 4,712,859
96.20 4,712,860
96.21 4,712,861
4,712,862
4,712,863
96.22 4,712,864
96.29 4,712,865
96.30 4,712,866
103 4,712,867
105 4,712,868
126 4,712,869
243 4,712,870
257 4,712,871
333 4,712,872
337 4,712,873
339 F 4,712,874
344 4,712,875
350 S 4,712,876
4,712,877
4,712,878
357 4,712,879
371 4,712,852
377 4,712,880
406 4,712,881
413 4,712,882
427 4,712,883
434 4,712,884
443 4,712,885
482 4,712,886
484 4,712,887
486 4,712,888
511 4,712,889
530 4,712,890
604 4,712,891
631 4,712,892

**CLASS 351**

123 4,712,893
208 4,712,894
243 4,712,895

**CLASS 354**

5 4,712,896
173.1 Re.32,558
219 4,712,897
288 4,712,898
316 4,712,899
400 4,712,900
407 4,712,901
416 4,712,902
433 4,712,903
475 4,712,904

**CLASS 355**

3 CH 4,712,905
3 TR 4,712,906
4 4,713,673
7 4,712,907
14 SH 4,712,908
4,713,674
20 4,712,909
53 4,712,910
69 4,713,675
74 4,712,911

**CLASS 356**

73 4,712,912
121 4,712,913
4,712,914
152 4,712,915
241 4,712,916
350 4,712,917
429 4,712,918

**CLASS 357**

23.5 4,713,676
4,713,677
23.6 4,713,678
38 4,713,679
51 4,713,680
52 4,713,681
54 4,713,682

**CLASS 358**

42 4,713,683
78 4,713,684
103 4,713,685
107 4,713,686
138 4,713,687
141 4,713,688
146 4,713,689
148 4,713,690
4,713,691
150 4,713,692
160 4,713,693
171 4,713,694
183 4,713,695
222 4,713,697
261 4,713,696
296 4,713,698
4,713,699
298 4,713,701
315 4,713,700

**CLASS 360**

79 4,713,702
97 4,713,703
4,713,704
98 4,713,705
104 4,713,706
106 4,713,707
113 4,713,708
121 4,713,709
4,713,710
123 4,713,711
128 4,713,712
4,713,713
137 4,713,714
4,713,715

**CLASS 361**

2 4,713,716
26 4,713,717
29 4,713,718
54 4,713,719
97 4,713,720
100 4,713,721
141 4,713,722
179 4,713,723
231 4,713,724
232 4,713,725
321 4,713,726
334 4,713,727
363 4,713,728
386 4,713,729
419 4,713,730
433 4,713,731

**CLASS 362**

61 4,713,732
80 4,713,733
147 4,713,734
183 4,713,735
214 4,713,736
285 4,713,737
296 4,713,738
424 4,713,739

**CLASS 363**

17 4,713,740
50 4,713,741
124 4,713,742
138 4,713,743
160 4,713,744
161 4,713,745

**CLASS 364**

170 4,713,747
200 4,713,748
4,713,749
4,713,750
4,713,751
4,713,752
4,713,753
4,713,754
4,713,755
4,713,756
4,713,757
4,713,758
4,713,759
405 4,713,760
406 4,713,761
424 4,713,762
424.1 4,713,763
4,713,764
431.05 4,713,765
4,713,766
453 4,713,767
460 4,713,768
464 4,713,769
474 4,713,770
487 4,713,771
491 4,713,773
496 4,713,772
500 4,713,774
513 4,713,775
513.5 4,713,776
4,713,777
4,713,778
514 4,713,780
521 4,713,779
552 4,713,781
553 4,713,782
557 4,713,783
559 4,713,784
569 4,713,785
715 4,713,786
717 4,713,787
718 4,713,788
724 4,713,789
784 4,713,790
900 4,713,791
4,713,792
4,713,793

**CLASS 365**

45 4,713,794
119 4,713,795
189 4,713,796
208 4,713,797

**CLASS 366**

133 4,712,919
144 4,712,920
151 4,712,921
288 4,712,922

**CLASS 367**

96 4,713,798
140 4,713,799
144 4,713,800

**CLASS 368**

10 4,712,923
76 4,712,924
179 4,712,925
251 4,712,926

**CLASS 369**

7 4,713,801
59 4,713,802

**CLASS 370**

32.1 4,713,803
58 4,713,806
68 4,713,804
85 4,713,805
94 4,713,807
4,713,808
97 4,713,809

**CLASS 371**

4 4,713,810
9 4,713,811
10 4,713,812
15 4,713,813
21 4,713,814
29 4,713,815
38 4,713,816
43 4,713,817

**CLASS 372**

8 4,713,818
9 4,713,819
41 4,713,820
44 4,713,821
69 4,713,822
90 4,713,823
99 4,713,824
107 4,713,825

**CLASS 373**

22 4,713,826

**CLASS 375**

7 4,713,827
30 4,713,828
37 4,713,829
109 4,713,830

**CLASS 376**

137 4,713,208
211 4,713,209
233 4,713,210
238 4,713,211
258 4,713,212
299 4,713,213
312 4,713,214

**CLASS 377**

8 4,713,831
45 4,713,832

**CLASS 378**

119 4,713,833

**CLASS 379**

28 4,713,834
58 4,713,836
79 4,713,835
93 4,713,837
134 B1 3,989,899
252 4,713,838

**CLASS 383**

29 4,713,839

**CLASS 384**

23 4,712,927
538 4,712,928

**CLASS 400**

76 4,712,929
120 4,712,930
196.1 4,712,931
208.1 4,712,932
248 4,712,933
332.5 4,712,934
645.1 4,712,935

**CLASS 401**

129 4,712,936
213 4,712,937

**CLASS 403**

24 4,712,938
4,712,939
133 4,712,940
151 4,712,941
174 4,712,942

**CLASS 404**

75 4,712,943

**CLASS 405**

26 4,712,944
132 4,712,945
170 4,712,946
288 4,712,947

**CLASS 407**

42 4,712,948
4,712,949

**CLASS 408**

72 R 4,712,950
158 4,712,951
211 4,712,952

**CLASS 409**

131 4,712,953
163 4,712,954

**CLASS 411**

17 4,712,955
55 4,712,956
82 4,712,957
506 4,712,958
533 4,712,959

**CLASS 413**

74 4,712,960

**CLASS 414**

42 4,712,961
144 4,712,962
222 4,712,963
281 4,712,964
339 4,712,965
458 4,712,966
563 4,712,967
694 4,712,968
730 4,712,969
4,712,970
744 A 4,712,973
744 R 4,712,971
4,712,972
757 4,712,974
786 4,712,975

**CLASS 415**

54 4,712,976
209 4,712,977

**CLASS 416**

1 4,712,978
96 R 4,712,979
224 4,712,980

**CLASS 417**

56 4,712,981
222 4,712,982
234 4,712,983
391 4,712,984
486 4,712,985

**CLASS 418**

63 4,712,986
150 4,712,987

**CLASS 419**

8 4,713,215

**CLASS 420**

452 4,713,217
532 4,713,216

**CLASS 422**

99 4,713,218
102 4,713,219
186.16 4,713,220
190 4,713,221

**CLASS 423**

122 4,713,222
140 4,713,223
219 4,713,224
230 4,713,225
242 4,713,226
305 4,713,227
317 4,713,228
321 R 4,713,229
341 4,713,230
356 4,713,231
390 4,713,232
608 4,713,233
648 R 4,713,234

**CLASS 424**

5 4,713,235
70 4,713,236
78 4,713,237
80 4,713,238
81 4,713,239
92 4,713,240
93 4,713,241
145 4,713,242
151 4,713,243
429 4,713,244
438 4,713,245
455 4,713,246
461 4,713,247
468 4,713,248
488 4,713,249

**CLASS 425**

114 4,712,989
130 4,712,990
145 4,712,991
207 4,712,992
466 4,712,993
543 4,712,994
562 4,712,995
725 4,712,988

**CLASS 426**

2 4,713,250
96 4,713,251
290 4,713,252
433 4,713,253
582 4,713,254
589 4,713,255
631 4,713,256

**CLASS 427**

27 4,713,257
35 4,713,258
39 4,713,259
129 4,713,261
130 4,713,262
206 4,713,263
207.1 4,713,264
341 4,713,265
412.5 4,713,266

**CLASS 428**

4 4,713,267
35 4,713,268
4,713,269
4,713,270
36 4,713,271
4,713,272
40 4,713,273
4,713,274
76 4,713,275
113 4,713,276
131 4,713,277
141 4,713,278
142 4,713,279
149 4,713,280
207 4,713,281
216 4,713,282
240 4,713,283
246 4,713,284
283 4,713,285
323 4,713,286
336 4,713,287
4,713,288
361 4,713,289
364 4,713,290
373 4,713,291
4,713,292
403 4,713,293
404 4,713,294
406 4,713,295
412 4,713,296
414 4,713,297
461 4,713,298
472.3 4,713,121
526 4,713,299
547 4,713,300
628 4,713,301
698 4,713,302

**CLASS 429**

26 4,713,303
136 4,713,304
194 4,713,305
218 4,713,306

**CLASS 430**

57 4,713,307
65 4,713,308
4,713,309
109 4,713,310
127 4,713,311
138 4,713,312
251 4,713,313
270 4,713,314
326 4,713,315
351 4,713,316
551 4,713,317
567 4,713,318
4,713,319
4,713,320
569 4,713,321
4,713,322
4,713,323

**CLASS 431**

20 4,712,996
89 4,712,997

**CLASS 432**

159 4,712,998

**CLASS 433**

8 4,712,999
18 4,713,000
4,713,001
30 4,713,002
173 4,713,003
174 4,713,004
180 4,713,005
201.1 4,713,006

**CLASS 434**

45 4,713,007
167 4,713,008
188 4,713,009
247 4,713,010
292 4,713,011
373 4,713,012

**CLASS 435**

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270 4,712,576

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752 4,713,025
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84 4,713,033

**CLASS 445**

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233 4,713,039

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131 4,713,400

**CLASS 522**

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**CLASS 546**

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345 4,713,460

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464 4,713,466

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**CLASS 560**

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495 4,713,486
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397 4,713,488

**CLASS 568**

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200 4,713,061
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353 4,713,066
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366 4,713,068
378 4,713,069

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| 05 : 4,712,749 | 4,712,803 | 4,713,355 | 4,713,164 | 4,713,170 | 4,712,783 |
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| 4,712,463 | 4,712,913 | 4,713,623 | 4,713,017 | 4,713,068 | 4,713,136 |
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| 4,712,483 | 4,712,958 | 4,713,643 | 4,713,064 | 4,713,102 | 4,713,174 |
| 4,712,490 | 4,712,999 | 4,713,647 | 4,713,130 | 4,713,225 | 4,713,178 |
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| | 293,163 | | 293,215 | | 293,224 | 26 : | 293,231 | | 293,187 | 48 : | 293,197 |
| | 293,168 | 10 . | 293,200 | | 293,239 | | 293,236 | | 293,188 | | 293,198 |
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| | 293,193 | | 293,218 | | 293,175 | 28 : | 293,252 | | 293,241 | 53 : | 293,181 |
| | 293,195 | | 293,262 | | 293,176 | 29 : | 293,162 | 37 : | 293,156 | | 293,246 |
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| | 293,203 | | 293,183 | | 293,266 | 34 : | 293,161 | 39 : | 293,164 | | 293,260 |
| | 293,229 | | 293,184 | 20 : | 293,226 | | 293,249 | 41 : | 293,159 | 55 : | 293,213 |
| | 293,244 | | 293,189 | 23 : | 293,217 | | 293,254 | | 293,233 | | 293,214 |
| | 293,264 | | 293,191 | 24 : | 293,177 | | 293,263 | 42 : | 293,211 | | |

## PLANT PATENTS

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| 06 : | 6,061 | | | | | |

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